CHAPTER 17
BIOLOGICAL RESOURCES*

VEGETATION

CLIMATIC AND SOILS INFLUENCES ON VEGETATION

The biological resources of Mono County are strongly influenced by the region's topography and climate. The dominant topographic features of the area are the Sierra Nevada Mountain Range to the west and the White Mountains to the southeast. Most of the county is in the rainshadow of the Sierra Nevada and receives less than ten inches of rain annually. Much greater amounts of precipitation fall at higher elevations in the mountains than at lower elevations. Approximately 70% of the precipitation falls as snow during winter storms (USFS, 1980). Cold winters with below-freezing temperatures and hot, dry summers are typical of the region. The climatic regime is the dominant influence on the plant communities and, consequently, the animal communities of the region. In the Mammoth Lakes region, the Sierra Crest is lower than areas to the north and south, so rainfall is higher and the area is more forested than the regions of the same elevation to the north and south (Taylor and Buckberg, 1987).

Geology and soil also influence vegetation type. Mono County contains several "special" soil types in which atypical vegetation may occur. These include soils that form on glacial alluvium derived from granitic bedrock, volcanic ash deposits and alkaline-saline internally drained basins.

Soils that occur on recent glacial moraines and in glacially derived alluvium along the Sierra foothills are deep, well-drained loams and sandy clay loams with abundant gravel and cobbles. These soils are relatively undeveloped and, consequently, have little organic matter. Vegetation growing in soil formed in glacially derived alluvium is used primarily for grazing. Vegetation types that typically grow on these soils are big and low sagebrush, rabbitbrush, bitterbrush and mixed perennial grasses.

Soils of the volcanic uplands occur on nearly flat to rolling terrain of volcanic tuff, tuffaceous sandstone and old alluvium. Many of these soils are ashy. Soil horizon thickness varies from shallow to deep. Soils are well to excessively drained. These units are used for grazing and, in some places, as a source of pumice. Vegetation that typically occurs on these soils includes shadscale, fourwing saltbush, Fremont dalea, Nevada dalea, little horsebrush, spiny hopsage, needleleaf rabbitbrush, blackbrush and Nevada ephedra.

Soils that form in internally drained basins are often strongly alkaline and have a high percentage of sodium. The high pH and/or high sodium content of these alkaline-saline soils interfere with the growth of most plants. In closed basins or where drainage is poor due to a high water table, excessive salt buildup occurs in soils. Uses are severely restricted because of soil texture, chemistry and drainage. Rubber rabbitbrush, inland saltgrass and black greasewood are tolerant of such conditions and occur on alkaline-saline soils (BLM).

VEGETATION AND LANDCOVER

Mono County is on the boundary of two biogeographic provinces, the Great Basin and the Californian and both mountain and desert plant series occur there. Dominant vegetation types

---

*Refer also to the section on "Plans and Policies" for cross-references to other documents which may provide additional site-specific information on biological resources--vegetation, wildlife, wildlife habitat, special-status species, etc.

include Alkali Desert Scrub, Sagebrush, Jeffrey Pine and Pinon-Juniper forest (see Figure 18, MEA Vegetation and Landcover-California GAP Analysis Landcover). Dominant landcovers include shrubland, evergreen forest and grasslands/herbaceous coverage (see Figure 19, MEA Vegetation and Landcover-USGS Landcover Analysis).

Figure 18 maps the major vegetation communities of Mono County in detail; Table 46 describes those vegetation communities. Eleven plant communities are found in the region. Seven of these are forest types and include conifers such as Jeffrey pine and red fir (USFS, 1981). Sagebrush scrub is the dominant brush community of the region. Meadows, alpine scrub and perennial grass series are the other remaining plant communities. Although they do not occupy large areas, these three communities provide diversity and are very important habitats for many wildlife species (Taylor and Buckberg, 1987; USFS, 1981). Other minor plant communities unique to the region are discussed later in the section on Special Habitats.

Figure 18 and Table 46 utilize the CALVEG classification system (USFS, 1979 and 1981). Most of Mono County falls into the South Sierran Ecological Province and, within that, into five Formation-Types: Conifer Forest/ Woodland, Sagebrush Shrub, Desert Shrub, Dwarf Scrub (Alpine) and Herbaceous. On the vegetation maps, the formation-types are further subdivided into vegetation Series (i.e., general dominance types), as shown in Table 46. Series are general categories, usually described by one dominant plant species.

In other plant classification systems (e.g., that of Holland, 1986 which is used widely in California), vegetation is further subdivided into Associations, which more accurately reflects the natural variation due to local conditions. For example, small areas within a series may have different vegetation because of the presence of streams or lakes, unusual soils, poor drainage patterns, etc. Association-level vegetation descriptions are usually done on a project-by-project basis, because they require more intensive field surveys. For cross-referencing, some of the plant associations from Holland (1986) that have the potential to occur in Mono County are listed below.

The Conifer Forest/Woodland

The Conifer Forest/ Woodland Formation Type includes the following Series: Mixed Conifer-Fir, Mixed Conifer-Pine, Jeffrey Pine, Red Fir, Lodgepole Pine, Singleleaf Pinon and Western Juniper. Conifers usually occur on cooler, moister mountain sites in Mono County. Lodgepole Pine and Red Fir series are tall, dense to moderately open forests that occur at high elevations and may have shrub and herb associates. At treeline, lodgepole pines may have the Krumholtz form; i.e., stunted and wind-pruned.

The Mixed Conifer-Fir and Mixed Conifer-Pine Series are found at lower elevations. These are dense to moderately open forests of tall needleleaf evergreen trees that may have shrub and broadleaf tree associates. The Jeffrey Pine Series is a more open forest that occurs on shallow serpentine soils with low soil fertility, glaciated soils on granitic outcrops and colder flats. The Pinon and Juniper Series consists of open stands of low needleleaf trees with shrub and herb associates. It typically occurs on drier, lower-elevation slopes and may interface with Sagebrush associations.

Potential associations within this Formation Type include: Whitebark Pine Forest, Bristlecone Pine Forest, Jeffrey Pine Forest, Great Basin Pinon Woodland and Great Basin Pinon-Juniper Woodland (Holland, 1986).

Sagebrush Scrub

These associations often occur on cold soils, or upland volcanic soils and ash deposits, from 4,000 to 10,600 ft. elevation. They form moderately dense to open cover of shrubs that are

low to medium in height (USFS, 1981). Typical species include sagebrush and bitterbrush, with juniper, shrubs and bunchgrasses. Sagebrush scrub may occur on certain atypical soils such as the glacially influenced soils derived from granitic bedrock.

Within this Formation Type several potential associations include: Big Sagebrush Scrub, Subalpine Sagebrush Scrub, Sagebrush Steppe and Great Basin Mixed Scrub (Holland, 1986).

Desert Scrub

This Formation Type is represented only in the extreme southern part of Mono County. It is an open shrub community dominated by creosotebush and may also have yuccas, cacti and Mormon tea.

Possible associations within the community are Mojave Creosotebush Scrub and Blackbrush Scrub.

Dwarf Scrub (Alpine)

Dwarf Scrub consists of short grasses and forbs, in dense to very open mosaics with extensive barren areas. It occurs at high elevations above treeline. The dominant specie is Phlox, with its most common associates being either buckwheat or Cymopterus. Other species associates are locally variable.

Possible associations include the Sierra Nevada Fell-Field and White Mountains Fell-Field (Holland, 1986).

Herbaceous

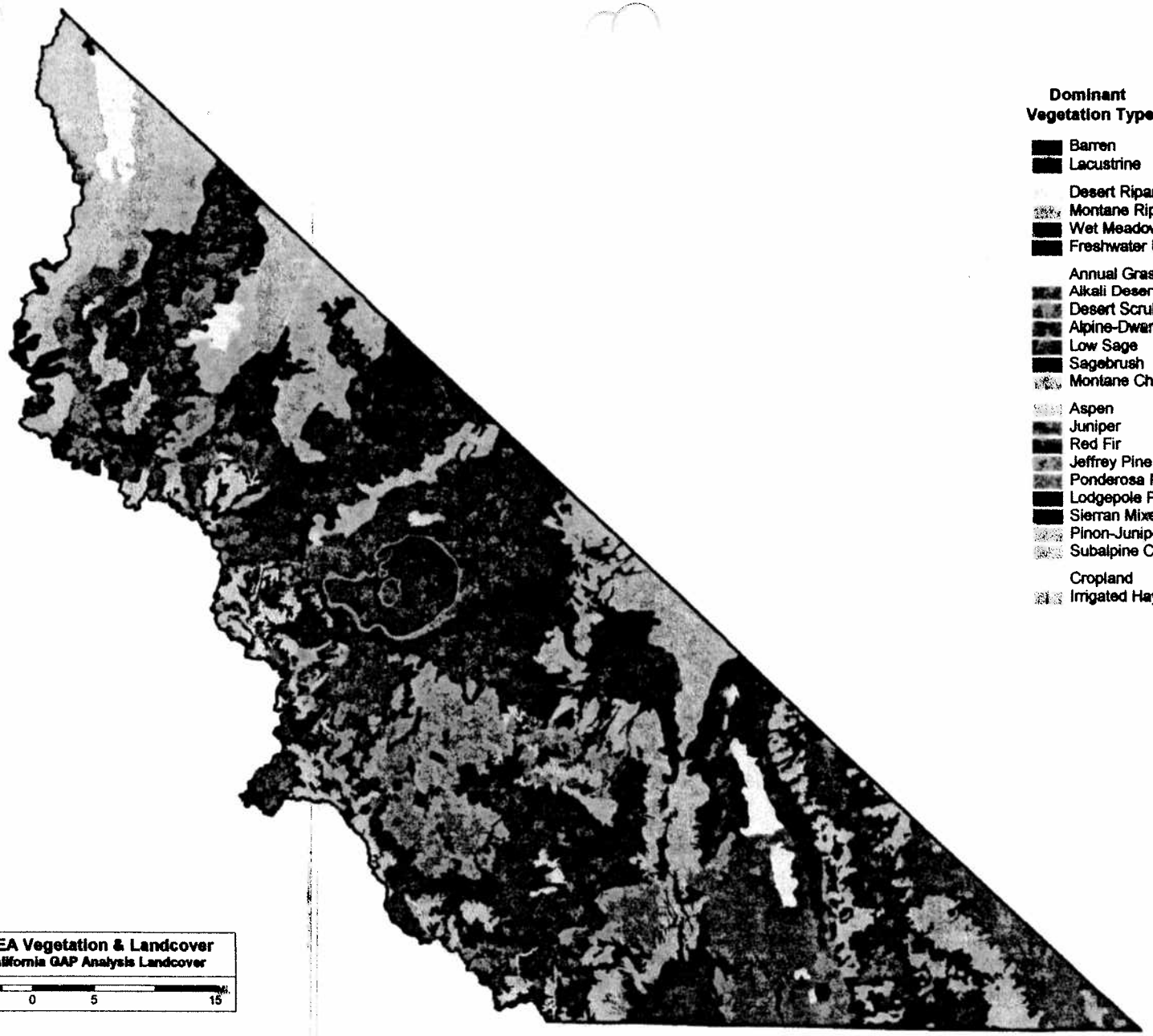
There are three distinct kinds of herbaceous communities within this Formation Type, these are described below (USFS, 1981). The first occurs in mountain meadows of Red Fir forests and consists mainly of forbs and grasses (e.g., Poa, Elymus and Bromus). The second type occurs on saline flats around Mono Lake and is characterized by salt-tolerant plants such as saltgrass, iodine bush or saltbush. A third type of herbaceous association occurs on the dry pumice flats and it consists of needlegrass, lupine, pussypaws, hulsea and evening primrose.

Potential associations include: Great Basin Grassland, Alkali Meadow and Montane Meadow.

Other

Other associations that occur locally within Mono County are not extensive enough to be mapped at the scale of the USFS maps of the Mono County vegetation. Some of these include:

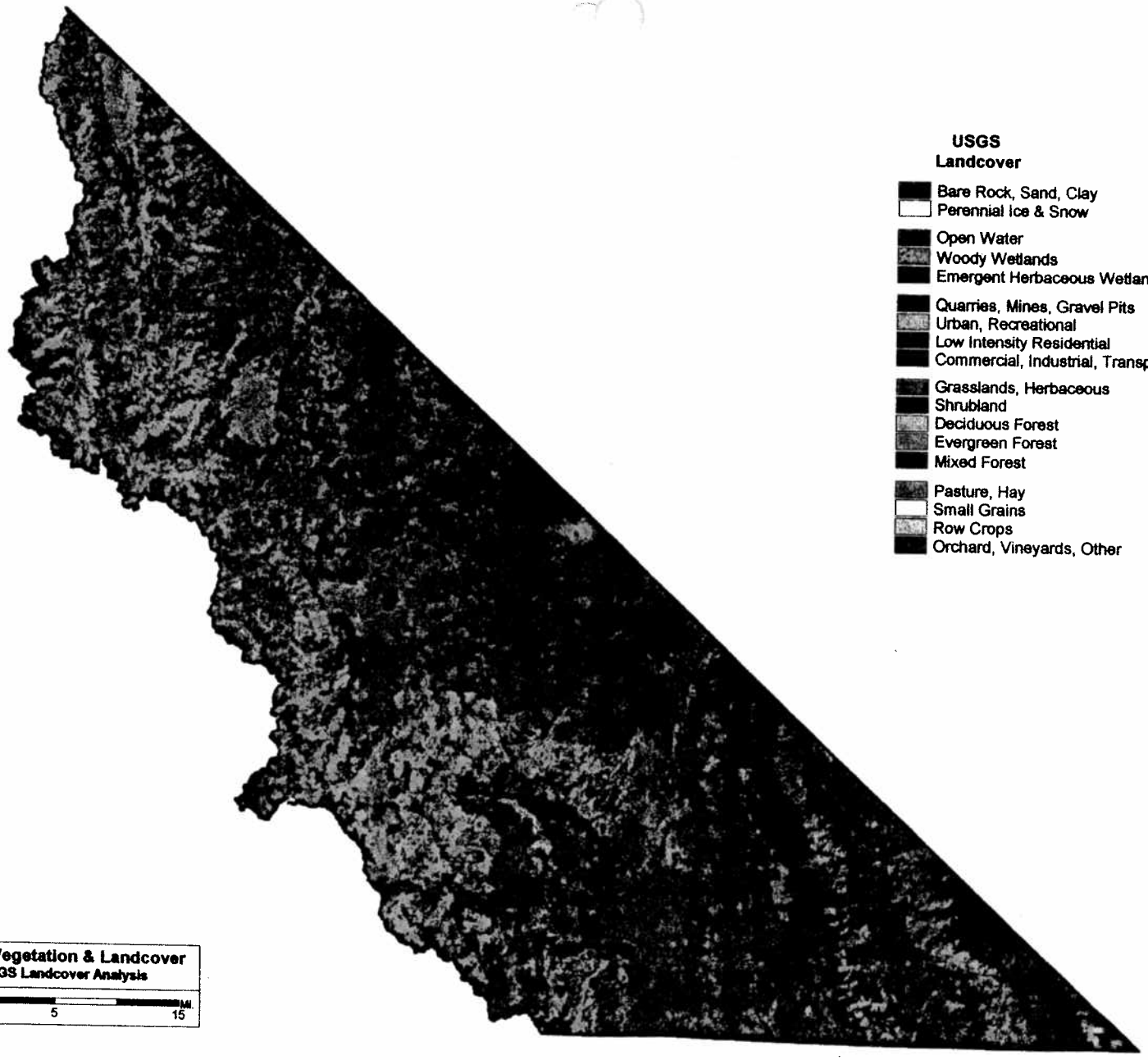
- Riparian (e.g., Aspen Riparian Forest, Cottonwood-Willow Riparian Forest, Montane Riparian Scrub and Modoc-Great Basin Riparian Scrub)
- Areas with highly alkaline or saline soils and internally drained basins (e.g., Desert Greasewood Scrub, Alkali Playa, Shadscale Scrub, Rabbitbrush)
- Uplands with volcanic ash deposits (e.g., Shadscale, Blackbrush)



Dominant Vegetation Type	Approximate Acreage
Barren	113,240
Lacustrine	46,588
Desert Riparian	6,782
Montane Riparian	7,607
Wet Meadow	15,299
Freshwater Emergent Wetland	21,440
Annual Grassland	1.1
Alkali Desert Scrub	238,795
Desert Scrub	9,818
Alpine-Dwarf Shrub	57,240
Low Sage	64,159
Sagebrush	579,809
Montane Chaparral	6,206
Aspen	8,237
Juniper	65,932
Red Fir	9,722
Jeffrey Pine	154,843
Ponderosa Pine	3,406
Lodgepole Pine	69,795
Sierran Mixed Conifer	918
Pinon-Juniper	399,585
Subalpine Conifer	79,723
Cropland	41,599
Irrigated Hayfield	3,112

MEA Vegetation & Landcover
California GAP Analysis Landcover

5 0 5 15 Mi.



USGS Landcover	Approximate Acreage
Bare Rock, Sand, Clay	79,831
Perennial Ice & Snow	595
Open Water	50,961
Woody Wetlands	6
Emergent Herbaceous Wetlands	235
Quarries, Mines, Gravel Pits	703
Urban, Recreational	10
Low Intensity Residential	965
Commercial, Industrial, Transportation'	2,077
Grasslands, Herbaceous	141,997
Shrubland	1,295,255
Deciduous Forest	7,277
Evergreen Forest	409,695
Mixed Forest	6,738
Pasture, Hay	33,970
Small Grains	3,913
Row Crops	336
Orchard, Vineyards, Other	0.68

MEA Vegetation & Landcover
USGS Landcover Analysis

5 0 5 15 MI

TABLE 46
VEGETATION COMMUNITIES IN MONO COUNTY

CONIFER FOREST/WOODLAND

Map Symbol:	**MF**
Series:	Mixed Conifer Fir
Dominant Species:	White Fir
Associated Species:	Red Fir, Lodgepole Pine, Douglas Fir
Elevation Range:	3,800 to 6,700 feet
Notes:	Stand structure and local dominance are highly visible.
Map Symbol:	**JP**
Series:	Jeffrey Pine
Dominant Species:	Jeffrey Pine
Associated Species:	Singleleaf pinon, lodgepole pine (occasionally), basin sagebrush
Elevation Range:	>6,500 feet
Notes:	Occurs as pure stands on glaciated soils or granitic outcrops.
Map Symbol:	**RF**
Series:	Red Fir
Dominant Species:	Lodgepole Pine
Associated Species:	Mountain Hemlock
Elevation Range:	5,500 to 3,000 + feet
Notes:	Grows in pure dense stands except in rocky ridgetops and areas with shallow water tables.
Map Symbol:	**MH**
Series:	Mountain Hemlock
Dominant Species:	Mountain Hemlock
Associated Species:	Lodgepole Pine, Western White Pine, Foxtail Pine, Red Fir (s. of Yosemite)
Elevation Range:	
Notes:	Dominates the subalpine forest north of Yosemite, usually in pure stands with very few associated conifer species. Occurs only on cold, moist slopes south of Yosemite.
Map Symbol:	**LP**
Series:	Lodgepole Pine
Dominant Species:	Lodgepole Pine
Associated Species:	
Elevation Range:	> 7,200 feet
Notes:	Occurs above Red Fir species. Grows in open or closed, even-aged stands on poorly drained soils or adjacent to meadows. Usually indicates glacial scouring or areas with shallow water tables. Is an important invader series following fire or disturbance.

TABLE 46 (continued)

Map Symbol:	**PJ**
Series:	Singleleaf Pinon
Dominant Species:	Singleleaf Pinon
Associated Species:	Western Juniper, Utah Juniper, Curlleaf Mountain Mahogany, Basin Sagebrush, Bitterbrush, Rabbitbrush
Elevation Range:	
Notes:	Dominates open woodlands on dry slopes north of Mono Lake. Becomes sole dominant conifer in low elevation mountain areas near Lee Vining.

Map Symbol:	**BP**
Series:	Bristlecone Pine
Dominant Species:	Bristlecone Pine
Associated Species:	Limber Pine
Elevation Range:	9,500 to 11,500 feet
Notes:	Occurs on dolomite soil, also in scattered populations on dry, rocky slopes. Indicates treeline and very poor soil conditions.

Map Symbol:	**WJ**
Series:	Western Juniper
Dominant Species:	Jeffrey Pine, Curlleaf Mountain Mahogany, Mule Ears
Associated Species:	Currant tobacco bush, Snowberry, Bitterbrush, Rabbitbrush
Elevation Range:	> 6,000 feet
Notes:	Occurs on dry, exposed ridges.

HARDWOOD FOREST/WOODLAND

Map Symbol:	**CG**
Series:	Greenleaf Manzanita
Dominant Species:	Greenlead Manzanita
Associated Species:	Jeffrey Pine
Elevation Range:	> 3,800 feet
Notes:	Sprouts after fire, seeds are viable for many years. Site can be occupied after about 5 years following fire or disturbance. Geographically associated with Mixed Conifer Fir and Red Fir series.

Map Symbol:	**CW**
Series:	Whiteleaf Manzanita
Dominant Species:	Wedgeleaf ceanothus
Associated Species:	
Elevation Range:	3,500 to 6,700 feet
Notes:	Dominant on dry slopes in same elevational range as Ponderosa Pine and Mixed Conifer Fir series. Usually occurs on south and west aspects or in rocky soils with dominant species. Indicates moderately poor soils and hot microclimates.

TABLE 46 (continued)

SAGEBRUSH SHRUB

Map Symbol:	**BS**
Series:	Basin Sagebrush
Dominant Species:	Bitterbrush
Associated Species:	Jeffrey Pine, Mountain Mahogany, Juniper, Greenleaf Manzanita, Rabbitbrush, Squirrel Tail
Elevation Range:	4,000 + feet
Notes:	Usually found on frigid soils lacking profile development.

Map Symbol:	**AP**
Series:	Saltbush
Dominant Species:	Saltbush
Associated Species:	Sagebrush, creosote, grasses
Elevation Range:	
Notes:	Generally occurs on dry alkaline plains and hills. Fourwing saltbush possibly abundant on saline desert flats and washes.

Map Symbol:	**BA**
Series:	Blackbush
Dominant Species:	Blackbush
Associated Species:	Yucca, Hopsage, Agave, Mormon tea
Elevation Range:	
Notes:	Occurs on non-saline soils, often under scattered Joshua trees or pinon pines.

DESERT SHRUB

Map Symbol:	**DL**
Series:	Creosote
Dominant Species:	Creosote
Associated Species:	Mormon tea, Cacti, Spanish bayonet, Joshua tree
Elevation Range:	
Notes:	Occurs on low elevation east slopes of Sierra Nevada. Dominant shrub of series.

Map Symbol:	**AC**
Series:	Cushion Plant
Dominant Species:	Cushion Plant
Associated Species:	Squirrel tail, Phlox, Buckwheat, Cymopterus
Elevation Range:	
Notes:	Diversity affected by local conditions and seed sources.

Map Symbol:	**HG**
Series:	Annual grass-forb
Dominant Species:	Owl's clover, Fiddleneck, Stork's bill
Associated Species:	Hardwoods growing in sheltered areas, Digger Pine
Elevation Range:	

TABLE 46 (continued)

Notes: May occur in pure stands or contain an overstory of oaks or buckeye.

Map Symbol:	**HM**
Series:	Perennial grass
Dominant Species:	Needlegrass, lupine, Pussy paws, Hulsea, Evening primrose
Associated Species:	
Elevation Range:	
Notes:	Includes many grasses and forbs. Dominates openings of poorly developed, drier soils within Red Fir and Lodgepole Pine series. Commonly bordered by Basin Sagebrush series and may include some of its components.

TABLE 46 SOURCE: Cal Veg., 1981; ESA, 1988.

INFLUENCE OF INSECT PESTS AND PATHOGENS ON SIERRA FORESTS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Currently, Sierra Nevada forests are in the aftermath of the 1987-92 drought. Over the last few years, these forests have sustained catastrophic levels of tree mortality due to drought, fire, disease and bark beetles.... Although these losses have occurred throughout the Sierra Nevada, they have been particularly high on the east side of the range, where mortality, mainly of pines and firs, has exceeded 80% of the standing volume in some stands (U.S. Forest Service [USFS] 1994). Mortality has been greatest in overly dense stands, especially those where past logging and/or fire-exclusion practices have promoted tree species susceptible to insects, pathogens, fire and drought. Wildfires also occurred during the drought, leaving many scorched trees susceptible to insects. Exacerbating these losses are the extreme fire hazards resulting from the dead and dying trees (SNEP, Vol. II, Ch. 45, p. 1179).

The Inyo National Forest has growing stock = 1,830 ft^3/acre; annual growth as a percentage of growing stock is 1.4%; annual mortality as a percentage of growing stock is 0.1%; annual mortality as a percentage of growth is 7.6% (SNEP, Vol. II, Ch. 45, Table 45.3, p. 1182).

Increased tree mortality (more than 0.2 trees per acre killed) was observed on the Inyo National Forest during the following years of below-average precipitation: 1919, 1920, 1922, 1923, 1926, 1927 and 1933 (SNEP, Vol. II, Ch. 45, Table 45.4, p. 1183).

Located at middle elevations on the steep eastern slope of the Sierra Nevada, Jeffrey pine forests are found on somewhat dry sites. They are composed almost wholly of Jeffrey pine with an understory of bitterbrush, sagebrush and scattered mountain mahogany. Key insect pests and pathogens are Jeffrey pine beetle, annosus root disease and dwarf mistletoe, operating in pest complexes as described for the other forest types (SNEP, Table 45.1). Located in the rain shadow of the Sierra Nevada, this forest type is well adapted to dry conditions, but, during droughts, outbreaks of Jeffrey pine beetle cause widespread mortality of trees, especially those weakened by root disease or mistletoe (SNEP, Vol. II, Ch. 45, p. 1187).

Found at the lowest, driest elevations on the east flank of the Sierra Nevada, the pinon-juniper forest type is composed almost wholly of single-leaf pinon pine and western juniper, growing singly or in combination, with a mainly sagebrush shrub layer. Key insects and pathogens are pine engravers killing pinon pines, often those weakened by black-stain root disease or annosus root disease, with the latter also infecting western juniper. Usually single trees or small groups are killed, but where stands are dense, large clumps can be killed (SNEP, Vol. II, Ch. 45, p. 1187).

STATUS OF RARE AND ENDEMIC PLANT SPECIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

The Sierra Nevada remains one of the botanical gems of North America. New plant species are still being discovered in this range and land managers across this magnificent landscape need to be aware of the unique biodiversity contained within the Sierra Nevada. Land managers should appreciate the evolutionary forces that have contributed to such a remarkable rare and endemic flora and provide appropriate levels of conservation to ensure that this resource is sustained for the American people (SNEP, Vol. II, Ch. 24, p. 704).

The Sierra Nevada represents nearly 20% of the California land base yet contains over 50% of the state's flora. Approximately 405 vascular plant taxa are endemic to the Sierra Nevada. Of this total, 218 taxa are considered rare by conservation organizations and/or state and federal agencies. In addition, 168 other rare taxa have at least one occurrence in the Sierra Nevada (SNEP, Vol. II, Ch. 24, p. 691).

[Assessment of plant distribution is compromised by very limited field surveys and difficulties in archiving information. For example,] ... *Sedum pinetorum* is believed to have been collected along the eastern slope of the Sierra Nevada in the vicinity of Mammoth, Mono County. However, the type population has never been relocated, nor has the species been collected since. Again, focused surveys may yet rediscover this inconspicuous plant of the eastern Sierra Nevada in the Mammoth area (SNEP, Vol. II, Ch. 24, p. 695).

Koch (1958) listed 72 mosses for the Harvey Monroe Hall Research Natural Area and vicinity toward Lee Vining along the eastern escarpment of the Sierra Nevada in Mono County. However, too few studies have been conducted to allow comparisons between the Sierra Nevada and the overall California bryophyte flora (SNEP, Vol. II, Ch. 24, p. 697).

Chapter 24, Volume II, of the SNEP documents provides the following information concerning rare and endemic plants in Mono County:

A. Distribution of Rare and Endemic Plants by River Basin

River Basin	# of Taxa from Database	Sierran Endemics	Rare Taxa	Endemic to River Basin
Mono Lake	65	45	32	1
Walker	33	18	23	4
Owens	104	71	59	8

B. Sierra Nevada Endemics at the River Basin Level

Mono Lake Basin: *Arabis tiehmii*

Walker River Basin: *Draba incrassata*
Orthotrichum spjutii
Plagiobothrys glomeratus
Senecio pattersonensis

Owens River Basin:

Astralagus sepultipes
Galium hypotrichium ssp. inyoense
Lomatium rigidum
Lupinus pratensis var. eriostachys
Penstemon papillatus
Phacelia inyoensis
Sedum pinetorum
Sidalcea covillei

C. Distribution of Rare and Endemic Plants in Mono County

Number of Taxa from Database	103
Sierra Endemics	60
Rare Taxa	65
Endemic to County	6

D. Sierra Nevada Endemic Species in Mono County

Astralagus monoensis
Carex tiogana
Draba incrassata
Lupinus duranii
Sedum pinetorum
Senecio pattersonensis

IMPACT OF NONINDIGENOUS PLANTS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Owing to the rain shadow created by the Sierra Nevada, there is a sharp environmental gradient from the relatively moist crest of the Sierra down the eastern slope to some of the most arid environments in North America. Desert regions in California are, in general, common and cover close to 28 million acres, or approximately 28% of the state. The desert communities of California, often severely degraded by mineral extraction, water diversion, military training, suburb expansion and motorized recreation, recover very slowly (on the order of hundreds of years). Exacerbating the current pressures on desert communities are a number of aggressive nonindigenous plants introduced by early European settlers (SNEP, Vol. II, Ch. 47, p. 1211).

The vegetation of the eastern slope varies considerably with altitude and latitude. The slope vegetation of the Great Basin desert is dominated by a mixture of woody shrubs such as Great Basin sagebrush, rabbitbrush and bitterbrush. In pristine, ungrazed sites, native perennial grasses make up the understory of this two-layer landscape, but in most places non-native grasses have replaced the native species. The understory of native annual and perennial species has also been largely replaced by nonindigenous plants. The problems caused by introduced plants in this habitat are exemplified by one single species that is the most widespread and pervasive of all weeds in these arid grasslands: cheat grass (SNEP, Vol. II, Ch. 47, pp. 1211-1212).

Cheat grass (*Bromus tectorum*), being indigenous to Central Asia, has a long association with human occupation and disturbance. Cheat grass is well adapted to frequent burning, intense grazing and agriculture and so it spreads rapidly in disturbance-dominated landscapes. In its native range, cheat grass thrives in chronically disturbed grasslands. Like with many of the

early introductions, cheat grass probably came to the western United States via contaminated seed lots in the mid to late 1800s. When introduced to western North America, cheat grass encountered an equitable climate, ample disturbance and a landscape free of its associated pests and pathogens. Its spread was rapid, filling more than 200,000 km^2 (80,000 mi^2) of the intermountain west in just 40 years. Cheat grass now dominates much of the arid western United States and the eastern slope of the Sierra Nevada, having both negative ecological and negative economic impacts (SNEP, Vol. II, Ch. 47, p. 1212).

EAST-SLOPE SIERRAN ECOSYSTEMS AND FIRE

For a discussion of this topic, see the section "Fire Hazards" in Chapter 19, Natural Hazards.

RANGELANDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section. For additional information on rangelands, see the section "Rangelands" in Chapter 3, Land Use.

Fletcher (1987) describes the presettlement vegetation of Mono Basin, based on historical accounts and ethnographic investigations. Perennial grasses were evidently abundant in the sagebrush-scrub community, especially giant wild rye (*Elymus cinereus*) and Indian rice grass (*Oryzopsis hymenoides*). The Kuzedika Paiute, a small band centered in the Mono Basin, collected seeds from these bunchgrasses and from desert needlegrass (*Stipa specosa*) as part of their varied diet, which also included desert peach (*Prunus andersonii*), elderberry (*Sambucus mexicana*) and buffaloberry (*Shepherdia argentea*). In addition, the Kuzedika held rabbit drives every fall, setting fire to the sagebrush to flush out the animals, a practice that would have been favorable to grass growth (SNEP, Vol. II, Ch. 3, p. 40).

On the east side, rangeland productivity decreased, evidently because of livestock mismanagement. Fletcher (1987) notes that geologist Israel Russell, who had visited Mono Lake in 1881, observed the effects of overgrazing there in 1887: "There was formerly sufficient wild grass in many portions of the basin to support considerable numbers of cattle and sheep; but owing to overstocking, these natural pastures are now nearly ruined" (Russell, 1889) (SNEP, Vol. II, Ch. 3, p. 41).

Historic unregulated grazing, which ended in the early 1900s, created widespread, profound and in some places, irreversible ecological impacts. Current livestock practices continue to exert reduced but significant impacts on the biodiversity and ecological processes of many middle- to high-elevation rangelands even though properly managed grazing (appropriate timing, intensity, duration of use, control of cowbirds and exclusion from wetlands) can be compatible with sustainable ecological functions (SNEP, Vol. I, Ch. 7, p. 114).

Increases in native perennial grasses are occurring on some eastside sagebrush steppe rangelands, but the continuing cheat-grass invasion of these habitats indicates that complete restoration of native plant communities is highly unlikely. In spite of persistent problems, the remarkably recovered condition of many ecosystem components of montane meadows and uplands today indicates that well-watered meadow/riparian ecosystems have tremendous potential for restoration of plant communities, while providing very important agricultural grazing values to society (SNEP, Vol. I, Ch. 7, p. 114).

Indicators of rangeland community health were mixed for the Toiyabe and Inyo national forests as shown below (SNEP Vol. III, Ch. 22, Tables):

Cover and Species Composition Data (Percentages) from Condition and Trend Plots in Sagebrush-Steppe Communities Over Four Decades

	1956-65	1966-75	1976-85	1986-95
Toiyabe NF				
Big Sagebrush	24.4	32.0	20.4	21.0
Perennial grasses	2.8	2.0	5.2	0.5
Forbs	29.3	25.3	28.1	43.0
Bull thistle	0	0	0.2	0
Litter	35.5	21.5	30.2	23.5
Bare Soil	18.5	20.0	24.8	10.5
Erosion pavement	8.5	18.5	6.4	19.0
Inyo NF				
Big Sagebrush	16.9	14.0	na	13.4
Perennial grasses	0.4	0	na	3.3
Forbs	24.8	25.5	na	23.7
Cheat grass	0.9	0.5	0	4.8
Litter	19.9	29.5	na	23.5
Bare Soil	19.2	23.5	na	26.5
Erosion pavement	32.9	20.5	na	17.4

Species Composition (Percentages) in Meadows Over Four Decades

	1956-65	1966-75	1976-85	1986-95
Toiyabe NF				
Grasses	16.3	17.0	24.8	na
Legumes	6.7	0	8.7	na
Sedges	26.4	44.4	22.4	na
Rushes	6.2	14.0	7.4	na
Inyo NF				
Grasses	12.5	13.0	9.6	18.0
Legumes	6.9	5.0	10.2	2.5
Sedges	37.8	25.5	53.8	35.3
Rushes	8.6	33.5	3.4	8.1

Cheat grass is the most common non-native component of the monitored sagebrush-steppe communities (Table 2). While cheat grass cover in all cases was low relative to native perennial grasses, competitive effects reducing native perennial grass and forb seedling recruitment could be important ... but sample sizes are so small that it is impossible to detect trends (SNEP, Vol. III, Ch. 22, p. 934-935).

Litter cover (%) and bare soil and erosion pavement exposure (%) indicate soil surface processes and protection or lack thereof from wind and water erosion (Table 3).... Cheat grass litter is a much less effective agent protecting against surface soil erosion than bases of perennial bunchgrasses or sagebrush canopy cover protecting against raindrop impact. Since litter cover has increased and bare soil has also increased on the Inyo Forest, some serious concerns arise on these upland sagebrush-steppe communities. Given that most of the Inyo sagebrush-steppe communities have strong rainshadow influences and are relatively

dry systems, they need particularly well-managed livestock grazing programs. The same can be said for the Toiyabe Forest (SNEP, Vol. III, Ch. 22, p. 934-935).

Based on our historical review of livestock grazing on what is now National Forest land, the Modoc Forest was the most disturbed in the sagebrush-steppe and the Lassen, Inyo and Toiyabe were probably not far behind. While the Modoc and other forests are showing declines in sagebrush and increase in cheat grass, the increase in native perennial grasses is a very favorable change. Similarly, increases in native perennial grasses on the ... Inyo National Forest is a very favorable indicator of improving ecosystem biodiversity. The general reduction in sagebrush cover is desirable so long as it remains as a major component of the sagebrush-steppe. Promiscuouis prescribed burning of sagebrush-steppe must be avoided where additional spreading of cheat grass is the likely result (Rasmussen 1994). Some reduction in sagebrush will be required to free up water resources for maintenance of a larger composition of perennial grasses. The slowing declining forb composition will likely contribute to poorer ground nesting bird diets in the future. The high and increasing cheat grass component on many of the forests is alarming, especially as California becomes more populated and even remote areas have greater probability of fire ignition (SNEP, Vol. III, Ch. 22, p. 934-935).

WILDLIFE

The plant communities of the region provide habitats for a diversity of resident and migratory wildlife. More than 350 species of terrestrial vertebrates are known or expected to occur in Mono County. No comprehensive biological survey of the county has been conducted. Each of the plant communities described above supports its own characteristic assemblage of wildlife species. Many species use several habitats on a daily or seasonal basis, in meeting their life history needs. Although a particular habitat may only be used for a short period, that habitat may be crucial to the species' survival. The spring breeding habitat for the California gull at Mono Lake is an excellent example of this crucial dependence.

Some specialist species, such as the sage grouse, are restricted to a single habitat, while generalist species such as the coyote, range over almost all habitats of the region.

Typical small mammals of the region include voles, deer mice and several species of chipmunks. White-tailed hares and Nuttal's cottontails are common (USFS, 1980; USFS, 1986; Ingles, 1965; National Academy of Science, 1987). Populations of these species fluctuate seasonally and year to year as weather changes affect food production and mortality (Ingles, 1965). Predators such as coyote, bobcat, badger, mountain lion and black bear are also found in the region. Mammals known or expected to occur in Mono County are listed in Table 47.

MULE DEER

A decline in mule deer numbers has occurred throughout California, including Mono County, since the mid-1960s. This decline prompted the Department of Fish and Game (CDFG) in 1975 to formulate a general statewide plan to restore and maintain deer herds in a healthy quantity in proportion to the available habitat. In 1977, the State legislature, through Assembly Bill 1520, mandated that CDFG develop deer herd management plans. The Bill required that a geographical unit of deer range be considered distinct from adjacent ranges and subsequently be planned for individually through individual management plans.

Seven of these management plans apply to Mono County, which provides deer habitat during part or all of the year for the Casa Diablo, Sherwin Grade, Buttermilk, Inyo/White Mountains, Mono Lake, East Walker and West Walker herds.

Deer herds in Mono County are defined largely by their winter ranges; frequently the summer ranges of deer from several herds will overlap. Mule deer migrate to upper elevations to breed (summer range) and travel downslope to spend the winter (winter range) in lower elevation pinon pine and desert shrub communities (Airola, 1980). Many deer that winter in Mono County cross the crest of the Sierra Nevada and summer on the west side (Kucera, 1985). Optimal summer habitats are intermediate canopy stages of conifer forest, high elevation riparian and montane shrub types. In the spring and summer deer feed primarily on herbaceous forage and shrubs in open tree stands, meadows and shrub lands, which are crucial for fawn development. Just as important as winter and summer habitats are the migration corridors, most of which are fairly narrow due to topographic constraints and therefore very susceptible to blockage from development (Kucera and McCarthy, 1988). A few of these corridors are wide swaths with ill-defined boundaries, such as San Joaquin Ridge. One current area of conflict is the migration route between U.S. Highway 395 and the Sierra escarpment that connects Swall Meadows to Mammoth Lakes (Thomas, 1988).

TABLE 47
MAMMALS KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Special Habitat[a]
Antilocapra americana	Pronghorn	5,4
Aplodontia rufa californica	Sierra Nevada mt. beaver	7,8
Canis latrans	Coyote	all
Castor canadensis	Beaver	7
Dipodomys microps	Great basin kangaroo rat	5
Dipodomys ordii Ord's	Kangaroo rat	6
Dipodomys panamintinuc	Panamint kangaroo rat	5
Eptesicus fuscus	Big brown bat	most
Erethizon dorsatum	Porcupine	2,7
Eutamias alpinus	Alpine chipmunk	1
Eutamias amoenus	Yellow-pine chipmunk	3,4
Eutamias minimus	Least chipmunk	5,4,3
Eutamias panamintinus	Panamint chipmunk	4,5
Eutamias speciosus	Lodgepole chipmunk	2,3
Felis concolor	Mountain lion	2,3,4
Gulo gulo	Wolverine	1,2
Lagurus curtatus	Sagebrush vole	5,4,6
Lasuirus cinereus	Hoary bat	most
Lepus californicus	Black-tailed jackrabbit	5,6,8
Lepus townsendii	White-tailed hare	1,2,3
Lynx rufus	Bobcat	4,5
Marmota flaviventris	Yellow-bellied marmot	1
Martes americana	Marten	2,1
Martes pennanti	Fisher	2,3
Mephitis mephitis	Striped skunk	7
Microdipodops megacephalus	Dark kangaroo mouse	6
Microtus californicus vallicola	Owens Valley vole	7,8
Microtus longicaudus	Long-tailed vole	7,8
Microtus montanus	Montane vole	8

Mustela erminea	Short-tailed weasel	2,1,4	
Mustela frenata	Long-tailed weasel	all	
Mustela vison	Mink	7,8	
Myotis leibii	Small-footed myotis	5,7	
Myotis lucifugus	Little brown bat	most	
Myotis volans	Long-legged myotis	most	
Neotoma cinerea	Bushy-tailed woodrat	most	
Neotoma lepida	Desert woodrat	most	
Ochotona princeps	Pika	1	
Odocoileus hemionus	Mule deer	7,4,3,2	
Ondatra zibethica	Muskrat	ponds	
Onychomys leucogaster	Northern grasshopper	5,6,4	
Ovis canadensis	Mountain sheep	1	Endangered
Perognathus parvus	Great basin pocket mouse	4,5	
Peromyscus maniculatus	Deer mouse	all	
Peromyscus truei	Pinon mouse	4	
Phenacomys intermedius	Heather vole	1	
Procyon lotor	Raccoon	7	
Reithrodontomys megalotis	Western harvest mouse	8	
Scapanus latimanus	Broad-handed mole	7,8	
Sorex lyelli	Mt. Lyell shrew	7,8	
Sorex merriami	Merriam's shrew	6	
Sorex monicolus	Dusky shrew	7,8	
Sorex palustris	Water shrew	7,8	
Sorex tenellus	Inyo shrew	7	
Sorex vagrans	Vagrant shrew	7,8	
Spermophilus beecheyi	California ground squirrel	8	
Spermophilus beldingi	Belding ground squirrel	8	
Spermophilus lateralis	Golden-mantled gr. squirrel	2,3,4,7	
Spermophilus townsendii	Townsend ground squirrel	5,6	
Spilogale putorius	Spotted skunk	rocky, 7	
Sylvilagus idahoenis	Pygmy rabbit	5,7	
Sylvilagus nuttallii	Nuttall's cottontail	7,8,4,5	
Tadarida brasiliensis	Brazilian free-tailed bat	most	
Tamias panamintinus acrus	Kingston mountain chipmunk		
Tamiasciurus douglasii	Chickaree	2,3	
Taxidea taxus	Badger	8	
Thomomys talpoides	Northern pocket gopher	8,7	
Urocyon cinereoargenteus	Gray fox	4,7	
Ursus americanus	Black bear	1,2	
Vulpes fulva	Red fox	2,1,8	Threatened
Vulpes macrotis	Kit fox	6,5	
Zapus princeps	Western jumping mouse	7,8	

NOTES: a) Habitat: 1 = alpine/subalpine, 2 = Lodgepole forest, 3 = Jeffrey pine forest, 4 = Pinon juniper, 5 = sagebrush-steppe, 6 = exposed lake bed and dunes, 7 = riparian, 8 = meadows and marshes.
SOURCE: National Academy of Sciences, 1987; CNDDB, 2000.

Development of the town of Mammoth Lakes, stimulated by development of recreational ski facilities at Mammoth Mountain, has already blocked a main migration route. Further development of this area can only worsen the situation (Thomas, 1988). Along the migration routes are holding areas that serve as rest and feeding stops

between the summer and winter ranges. As the deer ascend in the summer to higher terrain, they may delay at a holding area for up to six weeks to wait for a late winter storm to pass, for snow to melt and for the green-up of herbaceous forage before they continue their journey. An overview of Deer Herd Use Areas throughout the county is shown in Figure 20. Figure 30 (see Appendix A) provides more detailed information on deer movement throughout the county and designates general and critical use areas. Figure 21 provides a summary of deer kill locations throughout the county.

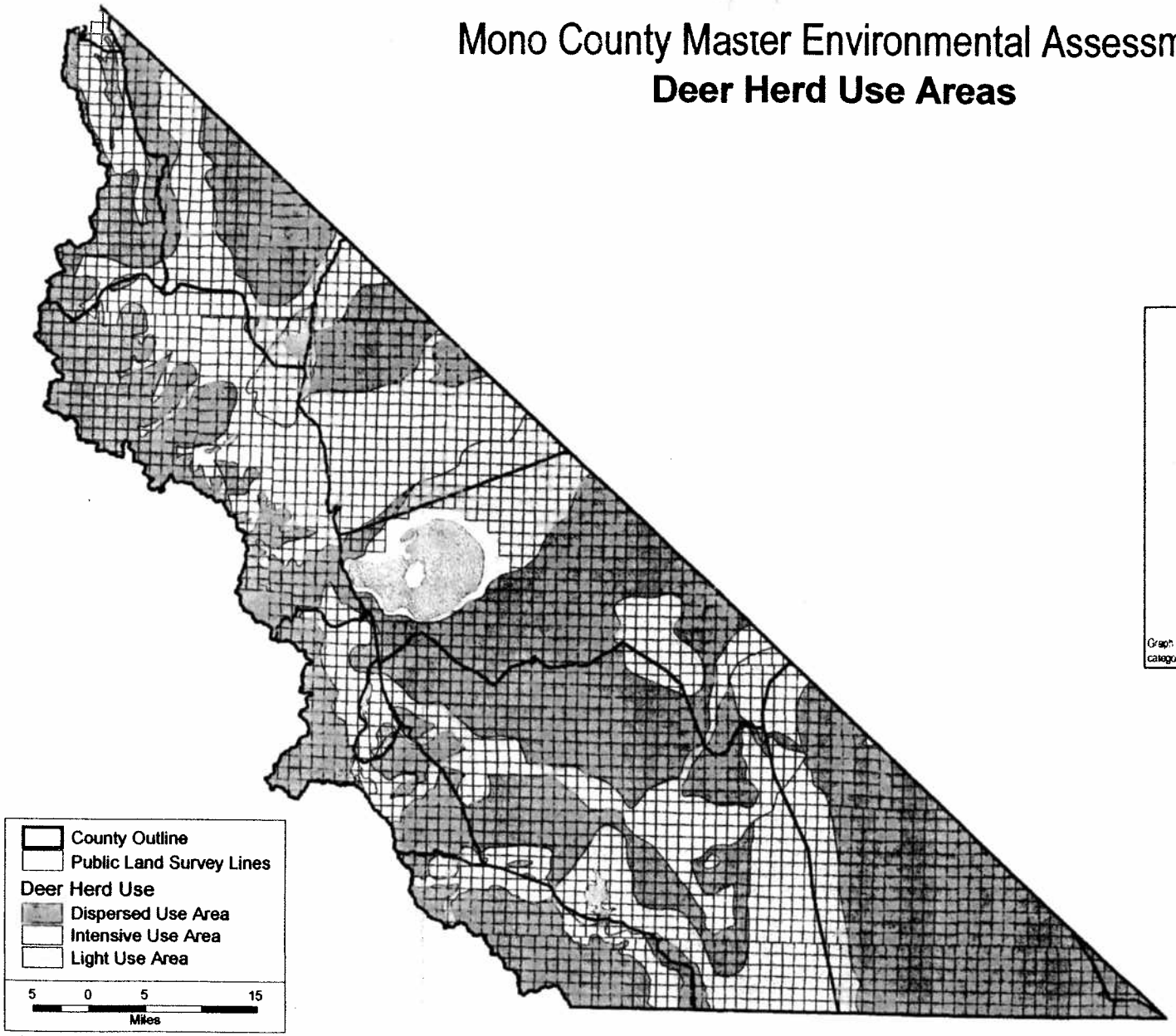
Specific herd information has now been collected on the Sherwin Grade, Casa Diablo, West Walker, East Walker and Mono Lake herds. Information on key habitats, such as aspen groves and riparian habitats, is available for all major herds in the county. Information on key deer use areas, especially winter and migration habitats, for the Sherwin Grade and West Walker herds is available as a result of telemetry studies performed on these two herds. Such information collection was possible because individual development projects proposed within critical deer ranges were required to assess the impacts of their construction. More field research (telemetry studies) has been performed for the Sherwin Grade and West Walker herds since a large percentage of the private land in Mono County is within the ranges of these two herds.

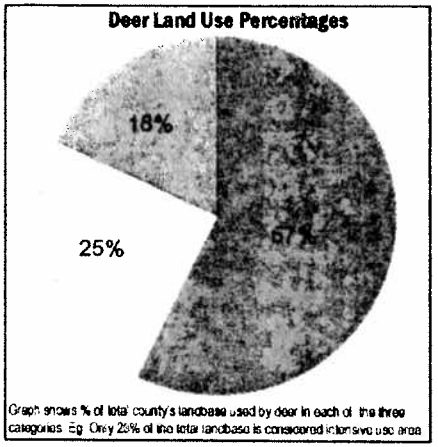
In addition to the threats posed by residential and recreational development to deer migration routes, there are other significant human influences (CDFG, 1986). Dispersed recreational use of portions of the deer's summer range by people, dogs and pack stock can disturb key fawning habitats, affecting reproduction and survival. Competition for grazing resources with livestock on all seasonal ranges is depressing herd vitality. Likewise, an unknown level of competition exists between deer and feral horses and burros (e.g., on the Truman Meadow winter range). Hunting, while potentially inflicting only a minimal impact in comparison to the other impacts associated with residential and recreational development, does influence the number of bucks in the herd and this in turn affects the ratio and age structure within the population. Each year, motorists kill an unquantified number of deer migrating across major highways in Mono County, especially U.S. Highway 395. Finally, other types of development, such as hydroelectric and geothermal energy projects and logging projects, affect deer herd populations depending on the specifics of the project, such as size, location, number of new roads, etc.

In response to these threats, CDFG is pushing for critical habitat acquisitions in various areas, such as Swall Meadows, Antelope Valley and Slinkard Valley, Sonora Junction area, Conway Summit area, Crowley Lake area and Round Valley. They are also recommending zoning for large acreage minimum parcels in areas designated as key wildlife areas, including deer winter and migratory ranges (Thomas, 1986).

Inyo and Humboldt-Toiyabe national forests have developed specific standards and guidelines for protection of mule deer habitat in their respective Land Management Plans. These include protective measures such as minimizing activities (grazing, timber, mining, vehicular access, energy and facility developments, etc.) that would affect key mule deer habitats, managing vegetation and habitats in key fawning areas, winter ranges, holding areas and key migration routes; and closing roads seasonally to benefit mule deer.

Mono County Master Environmental Assessment
Deer Herd Use Areas





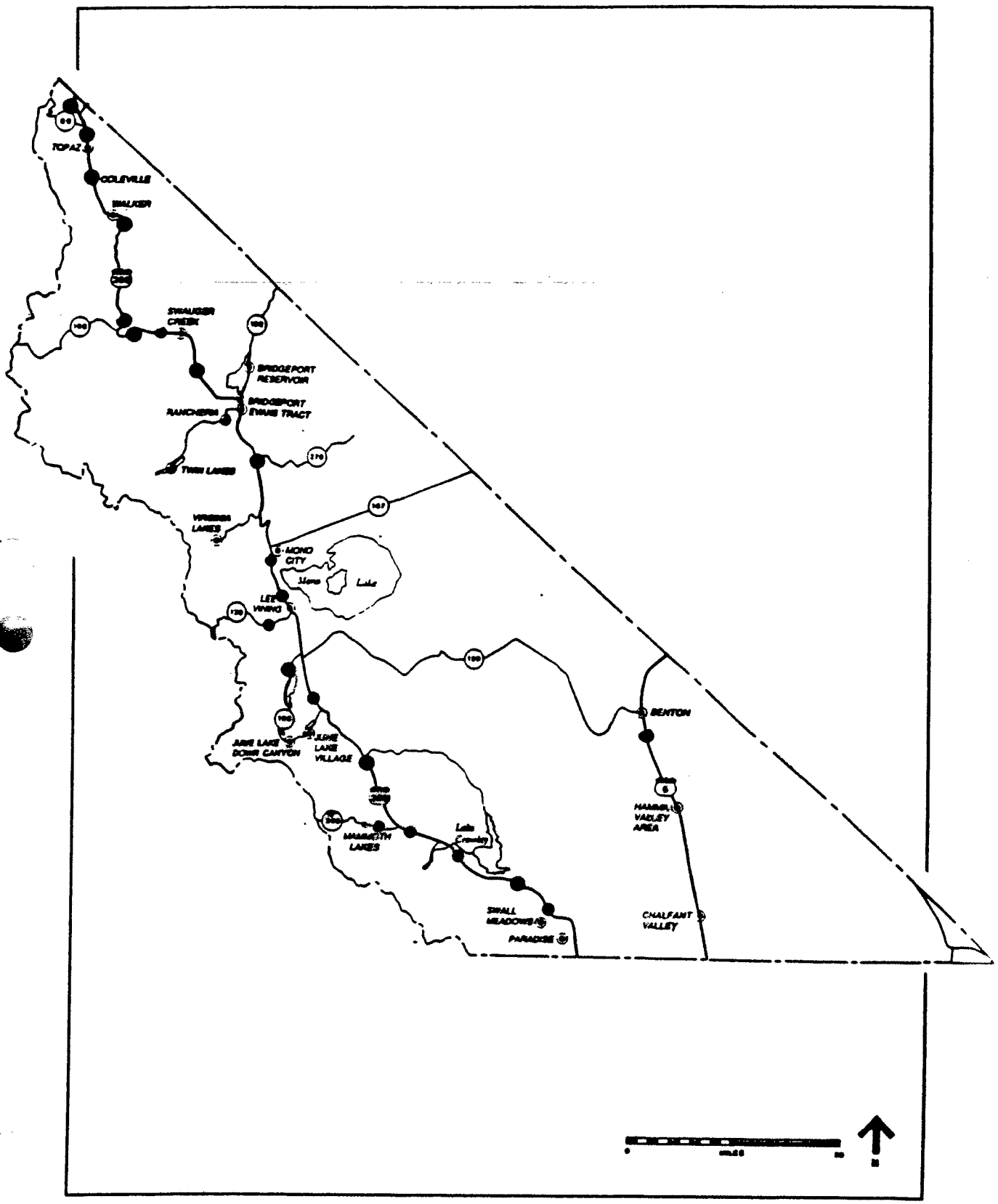
County Outline
Public Land Survey Lines

Deer Herd Use
Dispersed Use Area
Intensive Use Area
Light Use Area

5 0 5 15
Miles

Data from Bureau of Land Management, 2001

FIGURE 21
DEER KILL LOCATIONS--MONO COUNTY



BIGHORN SHEEP

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Mountain (bighorn) sheep (*Ovis canadensis*) populations in the Sierra Nevada were decimated following the arrival of Europeans in the mid-19th century. Sheep populations in the Sierra were originally scattered along the crest and east slope from Sonora Pass south, and along the Great Western Divide of what is now Sequoia National Park; there was also a population in the Truckee River drainage. Likely causes for the precipitous population decline include market hunting, severe overgrazing by domestic livestock, and probably most importantly the transmission of respiratory bacteria from domestic sheep to bighorn that were fatal to the latter (SNEP, Vol. II, Ch. 25, p. 714).

By the 1970s, only two populations remained in the Sierra Nevada: in the vicinity of Mount Baxter (ca 220 individuals) and Mount Williamson (ca 30 individuals), west of Independence. From 1979 until 1988, the Mount Baxter population was used by the California Department of Fish and Game, in cooperation with the U.S. Forest Service and the National Park Service, to successfully reestablish herds near Wheeler Ridge, Mount Langley, and Lee Vining Canyon. Some cougars were removed from the Lee Vining Canyon areas to reduce significant losses while that herd was getting established. By 1990, the three introduced herds were all increasing and the overall Sierra bighorn population was at least 300 (SNEP, Vol. II, Ch. 25, p. 715).

Between 1977 and 1987, cougar (*Felis concolor*) depredation reports in Inyo and Mono counties, as well as for California as a whole, increased dramatically. During the extended drought of the late 1980s and early 1990s, the herds gradually abandoned their low elevation winter ranges for much higher elevation sites that, while inferior from the standpoint of forage and protection from cold, were relatively snow-free during the drought and afforded protection from predation. This profound behavior change is attributed by Wehausen (1995) to heavy cougar predation pressure on the traditional low-elevation ranges. Concurrent with this change in behavior has been a steady decline in population (SNEP, Vol. II, Ch. 25, p. 715).

The Lee Vining Canyon population declined from approximately thirty-six ewes in 1993 to fourteen in 1995. Whether from accidents or an inferior energetic balance, the new situation is distinctly pessimistic, with the Sierra Nevada population probably well below the 250 recorded when reintroduction began in 1979 (SNEP, Vol. II, Ch. 25, p. 715).

There is no reason to assume cougar populations were smaller than at present prior to settlement, although they may well have fluctuated significantly over time. But whereas sheep were widespread in the Sierra at settlement, presently they only persist in scattered small pockets of high elevation habitat where snow depths are tolerable and cougars absent. One possible explanation is that in the past, sheep herds were sufficiently well-distributed and large that herds in decline on account of heavy predation or weather were supplemented by colonists from other thriving herds, thus providing a buffer for local perturbations as well as maintaining genetic diversity. The small and isolated populations now present can no longer provide either function (SNEP, Vol. II, Ch. 25, p. 715).

Management of the Sierran bighorn is facilitated by the Sierra Interagency Bighorn Sheep Advisory Group, which includes technical representatives from participating agencies. This group is now considering a recommendation that a captive breeding program be established as insurance against a complete collapse of the Sierran populations and as a source for future reintroduction. However, domestic sheep and cattle allotments on the public lands of the eastern slope and Sierra crest, with their well-known potential for disease introduction into bighorn, greatly reduce the number of potential sites available for reintroduction. So long as populations are relatively small and disconnected, some controls on predation, especially through cougar removals, may also be necessary (SNEP, Vol. II, Ch. 25, p. 715).

BIRDS

There is a diverse breeding avifauna in the area, which is complemented by winter migrants. There are approximately 240 bird species potentially breeding in the county during the spring. Waterfowl and shorebirds comprise the bulk of the winter migrants and are mainly concentrated around Mono Lake and Crowley Lake (USFS, 1980).

Typical bird species of forest habitats are the Clark's nutcracker, blue grouse, hermit thrusher and white-breasted nuthatch, among others. The drier sagebrush habitats contain sage grouse, sage thrasher and vesper sparrow. The important avian predators of the area are the American kestrel, red-tailed hawk, Cooper's hawk, northern goshawk, northern harrier, great horned owl and golden eagle. Bald eagles move through during fall migration, following the Owens River (McCarthy, 1987). Birds known or expected to occur in Mono County are listed in Table 48.

TABLE 48
BIRDS KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Accipiter cooperii	Cooper's hawk	4,5,6	R	
Accipiter gentilis	Northern goshawk	4,6	R	
Accipiter gentillis	Sharp-shinned hawk	4,5,6	R	
Actixis macularia	Spotted sandpiper	1,2,3,4	M	
Aechmophorus occidentalis	Western grebe	1	R	
Aegolius acadicus	Northern saw-whet owl	4,6	M	
Aeronautes saxatalis	White-throated swift	1-7	M	
Agelaius phoeniceus	Red-winged blackbird	3,4,5	R	
Alectoris chukar	Chuckar	5	R	
Amphispiza belli	Sage sparrow	5	R	
Amphispiza bilineata	Black-throated sparrow	5	M	
Anas acuta	Northern pintail	1,3	R	
Anas americana	American widgeon	1	R	
Anas clypeata	Northern shoveler	1,3	R	
Anas cressa	Green-winged teal	1,3	R	
Anas cyanoptera	Cinnamon teal	1,3	R	
Anas discors	Blue-winged teal	1,3	M	
Anas platyrhynchos	Mallard	1,3	R	
Anas strepera	Gadwall	1,3	R	
Anser albifrons	Greater white fronted goose	1	M	
Anthus spinoletta	Water pipit	1,2,5	M	
Aphelocoma coerulescens	Steller's jay	4,5,6	R	
Aquila chrysaetos	Golden eagle	4,5,6	R	
Archilochus alexandri	Black-chinned hummingbird	4,5	M	
Ardea herodias	Great blue heron	1-5	M	
Arenaria interpres	Ruddy turnstone	1,2	M	
Asio otus	Long-eared owl	4,5,6	R	
Asio otus	Short-eared owl	3,5	M	
Asyndesmus lewis	Lewis' woodpecker	4,6	M	
Athene cunicularia	Burrowing owl	5	M	
Ayhthya valisineria	Canvasback	1	M	
Aythya affinis	Lesser scaup	1	M	
Aythya americana	Redhead	1	R	
Aythya collaris	Ring-necked duck	1	M	
Aythya marila	Greater scaup	1	M	
Bombycilla cedrorum	Cedar waxwing	4,5,6	M	
Bombycilla garrulus	Bohemian waxwing	6	M	
Botaurus lentiginosus	American bittern	3	M	
Brachyramphus marmoratum	Marbled murrelet	1	M	
Branta bernicula	Brant	1	M	
Branta canadensis	Canada goose	1-3,5	R	
Bubo virginianus	Great horned owl	4,5,6	M	
Bubulcus ibis	Cattle egret	5	R	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Bucephala albeola	Bufflehead	1	M	
Bucephala clangula	Common goldeneye	1	M	
Buteo jamaicensis	Red-tailed hawk	4,5,6	R	
Buteo lagopus	Rough-legged hawk	3,5	M	
Buteo lineatus	Red-shouldered hawk	4	M	
Buteo swainsoni (nesting)	Swainson's hawk	4,5	M	CA Threatened
Butorides striatus	Green-backed heron	1,3	M	
Calamospiza melanocorys	Lark bunting	5	M	
Calcarius lapponicus	Lapland longspur	2,5	M	
Calcarius ornatus	Chestnut-collared longspur	5	M	
Calidris alpina	Dunlin	1,2,3	M	
Calidris canutus	Red knot	1,2	M	
Calidris minutilla	Least sandpiper	1,2	R	
Calypte anna	Anna's hummingbird	4,5	M	
Capella gallinago	Common snipe	1-5	R	
Carpodacus cassinii	Cassin's finch	4,5,6	R	
Carpodacus mexicanus	House finch	5	M	
Carpodacus purpureus	Purple finch	5,6	M	
Cassidix mexicanus	Great-tailed grackle	3,5	M	
Cathartes aura	Turkey vulture	1-6	R	
Catharus guttata	Hermit thrush	6	M	
Catharus ustulata	Swainson's thrush	4	M	
Catherpes mexicanus	Rock wren	5,6	M	
Catoptrophorus semipalmatus	Willet	1,2	M	
Centrocercus uropasianus	Sage grouse	5	R	
Certhia familiaris	Pygmy nuthatch	6	R	
Chaetura pelagica	Chimney swift	1-7	M	
Chaetura vauxi	Vaux's swift	1-7	M	
Charadrius alexandrinus	Snowy plover	1,2	M	
Charadrius semipalmatus	Semipalmated plove	1,2	M	
Charadrius vociferus	Killdeer	1,2,3,5	R	
Chen caerulescens	Snow goose	1	M	
Chen rossii	Ross' goose	1	M	
Chlidonias niger	Black tern	1	M	
Chondestes grammacus	Lark sparrow	5	M	
Chordeiles minor	Common nighthawk	3,5	M	
Cinclus mexicanus	American dipper	1,4	R	
Circus cyaneus	Northern harrier	3,5	R	
Cistothorus palustris	Marsh wren	3	R	
Coccyzus americanus	Yellow-billed cuckoo	4	M	
Colaptes auratus	Northern flicker	4,5,6	R	
Columba fasciata	Band-tailed pigeon	4,5,6	M	
Contopus sordidulus	Western wood pewee	4,6	M	
Corvus brachyrhynchos	Black-billed magpie	5	R	
Corvus corax	American crow	5	M	
Cosmerodious albus	Great egret	1,3	M	
Crocethia alba	Sanderling	1,2	M	
Cyanocitta stelleri	Barn swallow	1-5	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Cygnus buccinator	Trumpeter swan	1	M	
Cygnus columbianus	Tundra swan	1	M	
Cypseloides niger	Black swift	1-7	M	
Dendragapus obscurus	Blue grouse	6	R	
Dendrocopos albolarvatus	White-headed woodpecker	6	R	
Dendrocopos nuttallii	Nuttall's woodpecker	4	M	
Dendrocopos pubescens	Downy woodpecker	4	R	
Dendrocopos villosus	Hairy woodpecker	4,6	R	
Dendroica coronata	Yellow-rumped warbler	4,5,6	M	
Dendroica discolor	Prairie Warbler	4	M	
Dendroica nigrescens	Black-throated gray warbler	4,6	M	
Dendroica occidentalis	Hermit warbler	4,6	M	
Dendroica palmarum	Palm warbler	4	M	
Dendroica pensylvanica	Chestnut-sided warbler	4	M	
Dendroica petechia	Yellow warbler	4	M	
Dendroica striata	Blackpoll warbler	4	M	
Dendroica townsendi	Townsen's warbler	4.6	M	
Egretta thula	Snowy egret	1,3	M	
Empidonax difficilis	Western flycatcher	4,6	M	
Empidonax hammondii	Hammond's flycatcher	4,6	M	
Empidonax oberholseri	Dusky flycatcher	4,5,6	M	
Empidonax traillii (nesting)	Willow flycatcher	4	M	CA Endangered
Empidonax wrightii	Gray flycatcher	5	M	
Eremophila alpestris	Horned lark	5	R	
Ereunetes pusillus	Semipalmated sandpiper	1,2	M	
Erolia bairdii	Baird's sandpiper	1,2	M	
Erolia fuscicollis	White-rumped sandpiper	1,2	M	
Erolia melanotos	Pectoral sandpiper	1,2,3	M	
Euphagus carolinus	Rusty blackbird	1,3	M	
Euphagus cyanocephalus	Brewer's blackbird	2,4,5	M	
Eupoda montana	Mountain plover	1,2	M	
Falco columbarius	Merlin	3,4,5,6	M	
Falco mexicanus	Prairie falcon	2-5	R	
Falco peregrinus	Peregrine falcon	2-5	M	
Falco sparverius	American kestrel	3,4,5,6	R	
Fulica americana	American coot	1-3	R	
Gallinula chloropus	Common moorhen	3	M	
Gavia arctica	Arctic loon	1	M	
Gavia immer	Common loon	1	R	
Gavia stellata	Red-throated loon	1	M	
Glaucidium gnoma	Northern pigmy owl	4,5,6	R	
Gymnorhinus cyanocephalus	Scrub jay	5	R	
Haliaeetus leucocephalus	Bald eagle	1,4	M	CA Endangered
Hesperiphona vespertina	Evening grosbeak	4,6	R	
Heteroscelus incanum	Wandering tattler	1,2	M	
Himantopus mexicanus	Black-necked stilt	1,2	M	
Hirundo rustica	Cliff swallow	1-5	M	
Hydroprogne caspia	Caspian tern	1,4	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Icteria virens	Yellow-breasted chat	4	M	
Icterus cucullatus	Hooded oriole	4	M	
Icterus galbula	Northern oriole	4,5	M	
Icterus spurius	Orchard oriole	4	M	
Ictinia misisippiensis	Mississippi kite	4	M	
Iridioprocne bicolor	Tree swallow	4	M	
Ixobrychus exilis	Least bittern	3	M	
Ixoreus naevius	Varied thrush	4,6	M	
Junco hyemalis	Dark-eyed junco	4,5,6	R	
Lagopus leucurus	White-tailed ptarmigan	5,7	R	
Lanis excubitor	Northern shrike	4,5,6	M	
Lanis Iudovicianus	Loggerhead shrike	5	M	
Larus argentatus	Herring gull	1	M	
Larus californicus	California gull	1-5	R	
Larus delawarensis	Ring-billed gull	1	R	
Larus philadelphia	Bonaparte's gull	1	M	
Leucosticte arctoa	Rosy finch	5,7	R	
Limnodromus griseus	Short-billed dowitcher	1,2,3	M	
Limnodromus scolopaceus	Long-billed dowitcher	1,2,3	M	
Limosa fedoa	Marbled godwit	1,2	M	
Lophodytes cucullatus	Hooded merganser	1	M	
Lophortyx californicus	California quail	4,5	R	
Loxia curvirostra	Red crossbill	4,6	R	
Megaceryle alcyon	Belted kingfisher	1,3,4	R	
Melanerpes formicivorus	Acorn woodpecker	6	M	
Melanitta deglandi	White-winged scoter	1	M	
Melanitta perspicillata	Surf scoter	1	M	
Melospiza georgiana	Swamp sparrow	3	M	
Melospiza lincolnii	Lincoln's sparrow	4,5	R	
Melospiza melodia	Song sparrow	3,4,5	R	
Mergus merganser	Common merganser	2	M	
Mergus serrator	Red-breasted merganser	1	M	
Mimus polyglottos	Northern mockingbird	5	M	
Mniotilta varia	Black-and-white warbler	4	M	
Molothrus ater	Brown-headed cowbird	3-6	M	
Myadestes townsendi	Townsend's solitaire	4,6	R	
Myiarchus cinerascens	Ash-throated flycatcher	4,5,6	M	
Nucifraga columbiana	Pinon jay	5,6	R	
Numenius americanus	Long-billed curlew	1,2	M	
Numenius phaeopus	Whimbrel	1,2	M	
Nuttallornis borealis	Olive-sided flycatcher	4,6	M	
Nycticorax nycticorax	Black-crowned night heron	3	M	
Oidemia nigra	Black scoter	1	M	
Oreortyx pictus	Mountain quail	4,6	R	
Oreoscoptes montanus	Sage thrasher	5	M	
Otus flammeolus	Flammulated owl	5,6	M	
Otus kennicottii	Western screech owl	4	M	
Oxyura jamaicensis	Ruddy duck	1	R	
Pandion haliaetus	Osprey	1	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Parula americana	Northern parula	4	M	
Parus gambeli	Common raven	1-6	R	
Parus inornatus	Mountain chickadee	4,6	R	
Passer domestieus	House sparrow	2,4,5	R	
Passerculus sandwichensis	Savannah sparrow	1,3,5	R	
Passerella iliaca	Fox sparrow	5	M	
Passerina amoena	Lazuli bunting	4,5	M	
Passerina cyanea	Indigo bunting	4	M	
Pelecanus erythrorhynchos	White pelican	1	R	
Phainopepia nitens	Phainopepla	4,5	M	
Phalacrocorax auritus	Double-crested cormorant	1	M	
Phalacrocorax pelagicus	Pelagic cormorant	1	M	
Phalaenoptilus nuttallii	Common poorwill	5	M	
Phalaropus fulicarius	Red phalarope	1	M	
Phalaropus lobatus	Red-necked phalarope	1	M	
Pheucticus ludovicianus	Rose-breasted grosbeak	4	M	
Pheucticus melanocephalus	Black-headed grosbeak	4,6	M	
Pica pica	Clark's nutcracker	6	R	
Picoides arcticus	Black-backed woodpecker	6	R	
Piplio chlorurus	Green-tailed towhee	5	M	
Piplio erythrophthalmus	Rufous-sided towhee	4,5	R	
Piranga ludoviciana	Western tanager	4,5,6	M	
Piranga rubra	Summer tanager	4	M	
Plegadis chihi	White-faced ibis	1	M	
Pluvialis dominica	Lesser golden plover	1,2	M	
Pluvialis squatarola	Black-bellied plover	1,2	M	
Podiceps auritus	Horned grebe	1	M	
Podiceps nigricollis	Eared grebe	1	R	
Podilymbus podiceps	Pied-billed grebe	1	M	
Polichonyx oryzivorus	Bobolink	3,4	M	
Polioptila caerulea	Blue-gray gnatcatcher	5	M	
Pooecetes gramineus	Vesper sparrow	5	M	
Porzano carolina	Sora	1-2	M	
Psaltriparus minimus	Plain titmouse	5,6	R	
Pyrocephalus rubinus	Vermillion flycatcher	3	M	
Rallus limicola	Virginia rail	3	R	
Recurvirostra americana	American avocet	1,2	M	
Regulus calendula	Ruby-crowned kinglet	4,5,6	M	
Regulus strapa	Golden-crowned kinglet	4,6	R	
Rhynchophanes mccownii	McGown's longspur	5	M	
Riparia riparia (nesting)	Bank swallow	1,3	M	CA Threatened
Salpinctes obsoletus	Brown creeper	4,6	R	
Sayornis nigricans	Black phoebe	5	M	
Sayornis saya	Say's phoebe	5,6	M	
Seiurus aurocapillus Oporornis tolmiei	Overbird	4	M	
Selasphorus platycercus	Broad-tailed hummingbird	4,5	M	
Selasphorus rufus	Rufous hummingbird	4,5,6	M	
Setophage ruticilla	American redstart	4	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Sialia currucoides	Mountain bluebird	5,6	R	
Sitta canadensis	Bushtit	5,6	R	
Sitta carolinensis	Red-breasted nuthatch	6	R	
Sitta pygmaea	White-breasted nuthatch	6	R	
Sphyrapicus thyroideus	Williamson's sapsucker	6	R	
Sphyrapicus varius	Red-breasted sapsucker	4,6	R	
Sphyrapicus varius	Yellow-bellied sapsucker	4	M	
Spinus lawrencei	Lawrence's goldfinch	4	M	
Spinus pinus	Pine siskin	4,5	R	
Spinus psaltria	Lesser goldfinch	4,5	M	
Spinus tristis	American goldfinch	4,5	M	
Spizella arborea	American tree sparrow	4,5	M	
Spizella atrogularis	Black-chinned sparrow	5	M	
Spizella breweri	Brewer's sparrow	5	M	
Spizella passerina	Chipping sparrow	5,6	M	
Stecorarius longicaudus	Long-tailed jaeger	1	M	
Steganopus tricolor	Wilson's phalarope	1	M	
Stelgidopteryx serripennis	N. roughwinged swallow	4	M	
Stellula calliope	Calliope hummingbird	4,5,6	M	
Stercorarius parasitious	Parasitic jaeger	1	M	
Stercorarius pomarinus	Pomarine jaeger	1	M	
Sterna forsteri	Forster's tern	1	M	
Sterna hirundo	Common tern	1	M	
Strix nebulosa	Great gray owl	6	R	CA
Endangered (nesting)				
Strix occidentalis	Spotted owl	6	R	
Sturnella neglecta	Western meadowlark	5	R	
Sturnus vulgaris	European starling	2,4,5	R	
Tachycineta thalassina	Violet-green swallow	4,6	M	
Thryomanes bewickii	Canyon wren	5,6	R	
Totanus flavipes	Lesser yellowlegs	1,2	M	
Tringa melanoleuca	Greater yellowlegs	1,2	M	
Tringa solitaria	Solitary sandpiper	1,2,3	M	
Troglodytes aedon	House wren	4,5	M	
Troglodytes bewickii	Bewick's wren	4,5	R	
Troglodytes troglodytes	Winter wren	4	M	
Turdus migratorius	American robin	4,5,6	R	
Tyrannus verticalis	Western kingbird	4,5	M	
Tyto alba	Common barn-owl	3,4,5	M	
Vermirora peregrina	Tennessee warbler	4	M	
Vermivora celata	Orange-crowned warbler	4,5	M	
Vermivora ruficapilla	Nashville warbler	4,5,6	M	
Vermivora virginiae	Virginia's warbler	4,6	M	
Vireo gilvus	Warbling vireo	4,6	M	
Vireo solitarius	Solitary vireo	4,6	M	
Wilsonia citrina	Hooded warbler	4	M	
Wilsonia pusilla	Wilson's warbler	4,6	M	
Xanthocephalus xanthoceph.	Yellow-headed blackbird	1,3	M	
Xema sabini	Sabine's gull	1	M	

TABLE 48 (continued)

Scientific Name	Common Name	Habitat[a]	R/M[b]	Special Status[c]
Zenaida asiatica	White-winged dove	4	M	
Zenaidura macroura	Mourning dove	4,5,6	R	
Zonotrichia albicollis	White-throated sparrow	4	M	
Zonotrichia atricapilla	Golden-crowned sparrow	4,5	M	
Zonotrichia leucophrys	White-crowned sparrow	4,5	R	
Zonotrichia querula	Harris' sparrow	4	M	

NOTES:

a. Habitat: 1 = lake, 2 = exposed lakebed, 3 = marsh, 4 = riparian zones, 5 = sagebrush-steppe, 6 = conifer forests, 7 = alpine.
b. R = Resident; M = Migratory.
c. As noted by the California Natural Diversity Data Base for Mono County, 2000.

SOURCE: National Academy of Sciences, 1987; CNDDB, 2000.

REPTILES AND AMPHIBIANS

At least ten reptile and amphibian species have been recorded in the Long Valley Caldera (USFS, 1980). These species have received little study in the area. Thus, there is almost no published information on their distribution and habitat use. Rattlesnakes (*Crotalus viridis*), gopher snakes (*Pituophis melanoleucus*), garter snakes (*Thamnophis elegans*), rubber boas (*Charina bottae*) and California Mountain Kingsnakes (*Lampropeltis zonata*), along with western fence lizards (*Sceloporus occidentalis*) and whiptails (*Cnemidophorus tigris*) are expected to occur. In wetter habitats, common species such as the Pacific treefrog (*Hyla regilla*), Great Basin spadefoot toad (*Scaphiopus intermontanus*) and western toad (*Bufo boreas*) should occur (WESTEC, 1986). Tiger salamander (*Ambystoma tigrinum*) have been recorded in the Long Valley Caldera; surveys in 1989 revealed other salamander sites.

Native amphibians of Mono County include Tiger salamander, *Ambystoma tigrinum* ssp. (stable or expanding population, may be introduced species); Mount Lyell salamander, *Hydromantes platycephalus* (species of special concern); Owens Valley web-toed salamander, *Hydromantes* spp. (species of special concern); Yosemite toad, *Bufo canorus* (endangered); Mountain yellow-legged frog (threatened); and Northern leopard frog, *Rana pipiens* (threatened) [SNEP, Vol. II, Ch. 31: Table 31.1, p. 924; Table 31.3, p. 943].

INVERTEBRATES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Based on current information, the Owens Valley in Inyo County is the site of highest endemicity of terrestrial insects in the Sierra Nevada region. Insect species there appear to have been isolated for a considerable period from both the rest of the Sierran species to the west, by the precipitous eastern slope and the Great Basin species to the east, by the White Mountains (SNEP, p. 739). Clearly, water is an issue of importance on the east side of the Sierra Nevada and particularly for the Owens Valley. Drastically changing drainage and flow patterns in this habitat

clearly changes the suitability of the area for many of these endemic species (SNEP, Vol. II, Ch. 26, p. 739).

Figure 26. 1 on p. 740 of the SNEP documents (Vol. II, Ch. 26) identifies 6 insect species that are found only in the Mono Basin.

The middle elevation Sierra Nevada has one of the richest butterfly faunas in temperate North America; its only close competitor is the Colorado Front Range. The Sierran fauna is overwhelmingly adapted to successional and edaphic, nonforest habitats (meadows, barrens, riparian corridors and alpine fell fields). Most of the Sierra is forested, yet most of its butterfly diversity is not found in the forest (SNEP, p. 743). Many species, however, are confined either to the west (Californian biotic province) or east (Artemisian) slope ... the east slope ones are high plains--high desert--steppe species such as *Colias alexandra*, *Satyrium behrii* and *Pontia beckerii* (SNEP, Vol. II, Ch. 27, pp. 745-746).

Anthocharis lanceolata is predominantly a western slope specie (also in the Coast Range and northwestern California) that, however, also occurs locally on the east slope, for example, in the Carson Range, in canyons east of Monitor Pass and in southern Inyo County (SNEP, Vol. II, Ch. 27, p. 746).

Aquatic invertebrates are rarely considered or evaluated in environmental impact assessments in the Sierra. Major changes have occurred in aquatic and terrestrial habitats in the Sierra over the last 200 years: we must logically assume that corresponding changes have occurred in aquatic invertebrate assemblages (SNEP, Vol. II, Ch. 35, p. 987). A species of brine shrimp, *Artemia monica*, is endemic to Mono Lake.... the brine shrimp and alkali fly of Mono Lake provide food for thousands of migrating waterfowl... Decreasing fresh water and increasing salinity in Mono Lake led to decreases in the alkali fly *Ephydra hians* prior to restoration of inflows to the lake ... (SNEP, Vol. II, Ch. 35, p. 993).

TABLE 49
INVERTEBRATES KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Location	Condition	Special Status[a]
Acroneuria Californica	Stone fly	Convict Creek	Unknown	
Acroneuria Pacifica	Stone fly	Convict Creek	Unknown	
Agraylea sp.	Stone fly	Convict Creek	Unknown	
Alloperla Pacifica	Stone fly	Convict Creek	Unknown	
Ameletus sp.	May fly	Convict Creek	Unknown	
Antocha Monticola	True fly	Convict Creek	Unknown	
Arctopsyche	Caddis fly	Convict Creek	Unknown	
Artemesia monica	Brine shrimp	Mono Lake		
Sensitive to increased salinity and alkalinity in Mono Lake.				
Baetis Diablus	May fly	Convict Creek	Unknown	
Baetis sp.	May fly	Convict Creek	Unknown	
Bezzia sp.	True fly	Convict Creek	Unknown	
Brachycentrus	Caddis fly	Convict Creek	Unknown	
Brachycentrus Americanus	Caddis fly	Convict Creek	Unknown	
Brachycentrus Occidentalis	Caddis fly	Convict Creek	Unknown	
Callisbaetis sp.	May fly	Convict Creek	Unknown	
Capina Elongata	Stone fly	Convict Creek	Unknown	
Chironomus Stigmaterus	True fly	Convict Creek	Unknown	
Chironomus Utahensis	True fly	Convict Creek	Unknown	
Chrysops sp.	Deer-fly larvae	Mono Lake	Unknown	
Cricotopus sp.	True fly	Convict Creek	Unknown	
Cryptolabis Sica/Mixa	True fly	Convict Creek	Unknown	
Culicoides ocidentallis	Biting midge	Mono Lake	Unknown	
Deuterophlebia Nielsoni	True fly	Convict Creek	Unknown	
Diamesa (N. sp.)	True fly	Convict Creek	Unknown	
Dicosmoecus Pallicornis	Caddis fly	Convict Creek	Unknown	
Dicranota sp.	True fly	Convict Creek	Unknown	
Dolophiloides sp.	Caddis fly	Convict Creek	Unknown	
Dorylaimus sp.	Nematode	Convict Creek	Unknown	
Dugesia sp.	Planaria	Convict Creek	Unknown	
Epeorus Longimanus	May fly	Convict Creek	Unknown	
Epeorus sp.	May fly	Convict Creek	Unknown	
Ephemerella heterocaudata	May fly	Convict Creek	Unknown	
Ephemerella Hystrix	May fly	Convict Creek	Unknown	
Ephemerella Flavilinea	May fly	Convict Creek	Unknown	
Ephemerella Infrequens	May fly	Convict Creek	Unknown	
Ephemerella Levis	May fly	Convict Creek	Unknown	
Ephemerella Pelosa	May fly	Convict Creek	Unknown	
Ephemerella Teresa	May fly	Convict Creek	Unknown	
Ephydra	Alkali fly	Mono Lake		
Of major concern since it is a productive food source for birds at Mono Lake and is sensitive to salinity and low lake levels.				
Ephydra Hians	Alkali fly	Mono Lake	Same as above	
Eukiefferielwa (n.sp.)	True fly	Convict Creek	Unknown	
Eyphilotec enoptes langstoni	Langston's blue butterfly	Six miles south of Sherwin Summit	Unknown	

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Euphydryas editha Monoensis	Mono checker-spot butterfly	West shore of Mono Lake; various mountainous areas as along Hwy.395.	Unknown	
Glossosoma Califica	Caddis fly	Convict Creek	Unknown	
Gyraulus similaris	Snail	Convict Creek	Unknown	
Helicopsyche Borealis	Caddis fly	Convict Creek	Unknown	
Heterlimnius Corpulentus	May fly	Convict Creek	Unknown	
Hermerodromia sp.	True fly	Convict Creek	Unknown	
Hexatoma sp.	True fly	Convict Creek	Unknown	
Hydropsyche Californica	Caddis fly	Convict Creek	Unknown	
Hydropsyche Oslari	Caddis fly	Convict Creek	Unknown	
Hydatostega	Stone fly	Mono Lake		
Formally known as species Hydrophorus plumbeus; could be rare but further taxonomic and distributional work is necessary.				
Hydromermis sp.	Nematodes	Convict Creek	Unknown	
Hygrotus fontinalis	See below	Travertine Hot Springs		Yes
Travertine band-thigh diving beetle. Runoff pools and shallow marshy pools have been modified for bathing to the detriment of the beetle.				
Ilyodrilus Tetraedus	Aquatic earthworm	Convict Creek	Unknown	
Lara sp.	Beetle	Convict Creek	Unknown	
Lepidostoma cascadense	Caddis fly	Convict Creek	Unknown	
Lepidostoma Rayneri	Caddis fly	Convict Creek	Unknown	
Lepidostoma sp. (2)	Caddis fly	Convict Creek	Unknown	
Leuctra Occidentalis	Stone fly	Convict Creek	Unknown	
Leuctra Sara	Stone fly	Convict Creek	Unknown	
Limnephilus Productus	Caddis fly	Convict Creek	Unknown	
Lymnaea Palustris Haydeni	Snail	Convict Creek	Unknown	
Mesomermis sp.	Nematode	Convict Creek	Unknown	
Micraesema Aspila	Caddis fly	Convict Creek	Unknown	
Nemotellus sp.	-----	Mono Lake	Unknown	
Nemoura Cinctipes	Stone fly	Convict Creek	Unknown	
Nemoura Oregonensis	Stone fly	Convict Creek	Unknown	
Neohermes Californicus	-----	Convict Creek	Unknown	
Neophylax Occidentis	Caddis fly	Convict Creek	Unknown	
Neophylax Richeri	Caddis fly	Convict Creek	Unknown	
Pyrgulopsis sp. "A" [b]	Spring-snail			
Located along eastern escarpment of Sierra Nevada from Little Lake to Owens Gorge; along western side of Owens Valley from French Spring to Marble Creek and in Long Valley, Adobe Valley and Deep Springs Valley. Most areas are near pristine though sites on the north and east tend to be considerably disturbed.				
Prygulopsis sp. "B" [b]	Spring-snail	Bramlette Ranch in Benton Valley		
Spring heavily impacted by diversion apparatus and livestock degradation of channelized stream section.				

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Pyrgulopsis sp. "C" [b]	Spring-snail	Warm Springs along western flank of White Mt. Small section of upflow habitat in good condition, but smaller spring to north unfenced and highly trampled by livestock and vehicle traffic.		
Pyrgulopsis sp. "D" [b]	Spring-snail	Indian Wells Valley, east. slope Sierra Nevada Impoundment on Sage Canyon stream of controlling streamflow just above site where snails collect; Sand Canyon used by livestock and streambed appears trampled and polluted.		
Pyrgulopsis sp. "E" [b]	Spring-snail	East side of Owens Valley along escarpment of Northern Inyo and White Mountains. Most of the localities for this snail have been disturbed.		
Pyrgulopsis sp. "F" [b]	Spring-snail	Fish Slough in 3 of 4 main springs Habitat affected by impoundments to create pool habitat for Owens pupfish, livestock disturbance (unfenced), human recreational activities and possibly by earthquakes.		
Odontomyia Catatsina sp.	____	Mono Lake	Unknown	
Odontomyia Odontomyia sp.	____	Mono Lake	Unknown	
Oxyenthira sp.	Caddis fly	Convict Creek	Unknown	
Paraleptophlebia Pallipes	May fly	Convict Creek	Unknown	
Paraleptophlebia sp.	May fly	Convict Creek	Unknown	
Paracymus Subceprens	Beatle	Convict Creek	Unknown	
Pepicia sp.	True fly	Convict Creek	Unknown	
Physa Anatina	Snail	Convict Creek	Unknown	
Pisidium Casertanum	Clam	Convict Center	Unknown	
Polycelis sp.	Planaria	Convict Creek	Unknown	
Polycentropus Halidus	Caddis fly	Convict Creek	Unknown	
Procladtus Freemani	True fly	Convict Creek	Unknown	
Protopila sp.	Caddis fly	Convict Creek	Unknown	
Psectrocladius (n. sp.)	True fly	Convict Creek	Unknown	
Pteronarcys Princeps	Stone fly	Convict Creek	Unknown	
Pteronarcella Regularis	Stone fly	Convict Creek	Unknown	
Rhyacophia Vao	Caddis fly	Convict Creek	Unknown	
Rhyacophila Bifila	Caddis fly	Convict Creek	Unknown	
Rhyacophia Vaccua	Caddis fly	Convict Creek	Unknown	
Rhyacophia Acropedes	Caddis fly	Convict Creek	Unknown	
Rhyacophila Vuzana	Caddis fly	Convict Creek	Unknown	
Simulium Arcticum	True fly	Convict Creek	Unknown	
Simulium Argtus	True fly	Convict Creek	Unknown	
Simulium Aureum	True fly	Convict Creek	Unknown	
Simulium Canadense	True fly	Convict Creek	Unknown	
Simulium Jacumbae	True fly	Convict Creek	Unknown	
Simulium Piperi	True fly	Convict Creek	Unknown	
Simulium Tuberosum	True fly	Convict Creek	Unknown	
Simulium Venustum	True fly	Convict Creek	Unknown	
Siphlonurus Occidentalis	May fly	Convict Creek	Unknown	
Smittia Sterrima	True fly	Convict Creek	Unknown	
Tanytarsus sp.	True fly	Convict Creek	Unknown	
Tipula Dorsolineata	True fly	Convict Creek	Unknown	
Tipula Kennedyana (n.sp.)	True fly	Convict Creek	Unknown	

TABLE 49 (continued)

Scientific Name	Common Name	Location	Condition	Special Status[a]
Tipula Mono	True fly	Convict Creek	Unknown	
Tryonia protea	Spring-snail	Hot Creek in Long Valley		
Relatively pristine area apart from human recreational activity.				
Wiedemannia	True fly	Convict Creek	Unknown	
Wormaldia Gabriella	Caddis fly	Convict Creek	Unknown	

NOTES:
a. Considered to be special status species by California Department of Fish and Game, U.S. Fish and Wildlife Service, or the scientific community.
b. "A" to "F" species letters reflect Robert Hershler's designations.

SOURCE: CNDDB, 2000; USFWS, 1988; Robert Hershler, Draft Status Survey of Hydrobiidae in Owens River Drainage; D.B. Herbst, 1988.

FISHERIES AND OTHER AQUATIC RESOURCES

The waters of California are managed by the California Department of Fish and Game (CDFG). Fish known or expected to occur in Mono County are listed in Table 50. Several creeks in Mono County are managed or proposed for the maintenance or reintroduction of threatened and endangered species such as the Paiute cutthroat trout in Cottonwood and Cabin creeks; and the Lahontan cutthroat trout in Slinkard, Mill, Silver, Wolf, By-Day, O'Harrel and Glass creeks. Other important management areas include Hot Creek Springs, Owens Gorge and Fish Slough for the endangered Owens tui chub. The Owens pupfish and Owens dace are found in Fish Slough (CDFG, 1988). The Owens dace is being considered for special status listing with the CDFG. The Owens dace is supported by specialized habitats. An inventory of Owens dace is currently being conducted at Crowley Lake; however, no complete survey of these habitats of Owens dace has been done in Mono County (CDFG, 1989).

CDFG also manages "special waters." Catch-and-release waters, one type of special waters where anglers use flies or lures with barbless hooks and release fish back into the stream, include East Walker River, Hot Creek, Owens River and Crowley Lake. Hot Creek is a premier trout fishing stream in California. Crowley Lake is especially important because it contains particularly big fish. If the water level in Crowley Lake were raised, important spawning areas on tributary creeks would be inundated and the increased area of shallow water could result in more water quality problems in the lake (Wong, 1988). Lower Rush Creek and Mammoth Creek have been suggested for designation as catch-and-release streams. Other "special waters" are Roosevelt, Lane and Poore lakes. Junction Lake is crucial because it serves as a Kamloops rainbow trout brood stock lake for Hot Creek Hatchery, which operates year-round and provides trout for all of eastern California.

Although the above-mentioned streams, rivers and lakes have been given special management attention, all perennial streams in Mono County provide important spawning habitat to wild trout species. Especially important spawning areas for the Crowley Lake trout population are Owens River, McGee Creek and Convict Creek. In addition, CDFG manages special biological resources alongside water courses.

Draft studies are available which describe various endemic snail species dependent upon springs with minor thermal components. No studies of invertebrate populations that are supported by geothermal habitats have been conducted. Surveys of riparian environments along eastern Sierra streams are being conducted to document salamander habitat areas (Wong, 1988). However, no complete aquatic survey for invertebrate species has been done in Mono County. Fragmentary information is available from individual collectors.

One study being proposed is for a comprehensive study of desert waters in all of Mono County (Herbst, 1988). Table 49 lists invertebrate species that have been identified by CDFG and U.S. Fish and Wildlife Service (USFWS) and species that have received recent research attention.

Other related issues concerning CDFG are the effects on stream, river and lake water quality and on riparian vegetation from overgrazing and water diversions. Many of the streams of Mono County experience some level of water diversion. For example, 88% of the stream mileage of the Owens River Drainage and Mono Basin has been affected by water diversions, with nearly 38% experiencing a 50% and greater diversion level of the undiverted flow. Twenty percent of the total stream mileage has been impacted by diversions of 100% (CDFG, 1985).

Water diversions occur all year long. Winter water diversions present a particular hardship on native trout species since monthly water availability in eastern Sierra streams is less evenly distributed than on western Sierra slopes (CDFG, 1988). Unlike the western slope of the Sierra Nevada that experiences lowest flow levels during the summer months (July through October), the Eastern Sierra's period of lowest flows occurs during the winter from November through March. Unlike regions of California that have greater rainfall, monthly stream flows in the Eastern Sierra almost totally depend upon the annual snowpack. As a result, streams exhibit two distinct flow periods: a relatively brief snow runoff period (May through August) a lengthy low-flow period of 34% of the mean annual water yield (September through April) maintained primarily by groundwater, lake or glacier outflow.

Little information exists to determine the amount of stream flow that is needed during the winter months to sustain the existing trout populations. CDFG, however, recognizes that winter water diversions only increase the naturally high levels of trout mortality in the winter (CDFG, 1988). Needham et al. (1945) reported that the over-winter losses of all sizes of brown trout ranged from 26% to 85% and averaged 60% over four years in Convict Creek. Winter losses of the larger trout (four inches and longer) were higher, ranging from 48% to 91% and averaging 80% over four years. Decreased water levels from winter diversions reduce the availability of aquatic food organisms and increase the amount of ice formation to further escalate naturally high winter mortality rates (CDFG, 1988).

Water diversions at any time of the year affect the vitality of riparian vegetation. CDFG estimates that 14% to 25% of riparian vegetation may have already been lost along the creeks of the Owens River and Mono Basin drainage system (Federal Energy Regulatory Commission, 1986). In addition to direct loss of riparian vegetation from varying levels of water diversion, riparian vegetation on diverted reaches has also become more susceptible to flood flow damage (Taylor, 1984). Continued stress over long periods of time may lead to decreased growth, increased mortality and reduced seed production and viability which may lead to changes in species diversity and community structure (Taylor, 1982).

STATUS OF AQUATIC HABITAT TYPES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> The decline of native fishes, amphibians and aquatic vertebrates in the Sierra Nevada ... reflects, to a large extent, the deterioration in the quality of the range's aquatic habitats. Factors contributing to this deterioration are multiple, cumulative and synergistic. They include changes in the amount and timing of stream flows, changes in water quality, reduction in structural complexity (from loss of riparian trees, channelization and other factors), changes in stream channels, siltation and invasions of non-native species.... (SNEP, Vol. II, Ch. 32, p. 945).

> The classification system of Moyle and Ellison (1991) was expanded and revised according to new knowledge obtained from personal observations, various forest management plans, consultation with other biologists and other sources. Each habitat type was then rated by the author in three categories: rarity, degree of disturbance and existing protection (Table 32.1). Rarity is essentially a rating of the frequency of the habitat type in the Sierra Nevada. Some habitat types, such as Mono Lake, are one of a kind; others are naturally rare (e.g., sphagnum bogs); others are widespread (e.g., alpine lakes) (SNEP, Vol. II, Ch. 32, p. 946).

> Nine of the aquatic habitat types were unique or extremely rare, which automatically gave them at least special concern status. This is appropriate because such habitat types tend to contain endemic organisms and to be subject to degradation. Examples include large lakes such as ... Mono Lake ... (SNEP, Vol. II, Ch. 32, p. 948).

STATUS OF FISH AND FISHERIES

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

> Native fishes of the Sierra Nevada were found in four distinct zoogeographic regions, which shared surprisingly few species among them: 1) the Sacramento-San Joaquin drainage; 2) the Lahontan drainage, consisting of the Susan, Truckee, Carson and Walker rivers; 3) the Eagle Lake drainage; and 4) the Owens drainage. Each of these regions had assemblages (communities) of fish species that characterized different environments within the drainage (Moyle 1976) (SNEP, Vol. II, Ch. 33, p. 954).

> The Owens drainage ... has its own distinct fish fauna of four endemic species, mostly confined to the Owens River itself. It was separated from the Lahontan drainage by the fishless Mono Lake basin. All four of the major fish faunal regions shared a common trait with the Mono Lake basin: they were fishless at high elevations. The high-elevation regions were largely fishless because of the combination of extensive glaciation during the Pleistocene (which created most of the lakes) and steep topography (which created many barriers to natural fish invasions). In streams, the highest elevations reached naturally by fish (ca 3,000 m [9,800 ft]) occur either in unglaciated areas in the southern portion of the range (Kern River) or in the more accessible mountain streams on the east side. Only

about 20 lakes naturally contained fish (e.g., Convict), which is considerably less than 1% of the total. All such lakes were closely associated with streams containing fish and had no barriers to invasion (SNEP, Vol. II, Ch. 33, p. 954).

In the eastern Sierra Nevada, the highest elevations were reached by Lahontan cutthroat trout (more than 3,000 m [9,800 ft]) and Paiute cutthroat trout (2,500 m [8,200 ft]). However, in the Carson, Walker and Truckee drainages it was not unusual to find nontrout species (Paiute sculpin, Tahoe sucker, speckled dace, Lahontan redside) above 2,000 m (6,600 ft).... Fish were completely absent from the Mono Lake basin (including all streams) and the Owens River watershed did not historically contain trout. Of the four fishes native to the Owens River basin, only the Owens sucker was found above 1,500 m (4,900 ft), reaching Convict Lake (2,300 m [7,500 ft]), the only lake in the southeastern Sierra Nevada that naturally contained fish (SNEP, Vol. II, Ch. 33, p. 954).

The range [of rainbow trout] was greatly expanded by the transplanting of fish above barriers and the widespread stocking of hatchery fish both into fishless areas and throughout the eastern Sierra Nevada (SNEP, Vol. II, Ch. 33, p. 957). It is worth noting that one of the side effects of indiscriminate planting of trout throughout the Sierra Nevada was the introduction of other species of fish either as "contaminants" in the water used for transporting the trout, or as bait released by anglers. As a result, threespine stickleback, Owens sucker and tui chub are present in the Mono Lake basin (SNEP, Vol. II, Ch. 33, p. 966).

Presumably, most streams large enough to support trout contain them, especially if they are downstream of lakes containing trout or immediately upstream of such lakes. In a 1992 survey of 20 km (12.5 mi) of streams in the upper Lee Vining and Mill Creek watersheds (Mono Lake basin), Knapp (1996 [SNEP, Vol. III, Ch. 8]) found only 2 km (1.25 mi) without fish. It is likely that, as in the case of lakes, more than 90% of stream habitat suitable for trout now supports populations of them (SNEP, Vol. II, Ch. 33, p. 967).

BIOTIC INTEGRITY OF WATERSHEDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

The biological health of Sierra Nevada watersheds can be measured using a broad-scale Index of Biotic Integrity (IBI). Indices of biotic integrity are measures of the health of streams and have been developed as an alternative to physical and chemical measures of water quality.... The basic idea is to combine a number of measures of the structure and function of fish communities into an index, on the assumption that the responses of an integrated community of fishes to changes in the environment would reflect both major environmental insults (e.g., a pesticide spill) and more subtle long-term effects, such as chronic non-point source pollution and changes in land use ... Biotic integrity is defined as "the ability to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the region (Karr and Dudley, 1981). An IBI is a method of measuring this complex idea and IBIs can be developed independently for different regions or streams (SNEP, Vol. II, Ch. 34, p. 975).

The following selected values for streams in Mono Count are taken from Appendix 34.1 (SNEP, Vol. II, Ch. 34, p. 984-85):

Name	Area (ha)	IBI	Storage (Acre Fee)	% Roads	% Roadless	% Fishless
Mono	174,723	36	87,670	4.57	67.5	86.1
Upper Owens	382,669	36	42,842	5.33	76.0	30.1
Mammoth Cr.	98,451	40	183,570	13.59	46.7	47.4
L.E. Fk. Walker	36,162	52	0	5.12	78.1	12.7
Slinkard Cr.	7,836	52	0	5.00	80.9	0
L.W. Walker	32,886	56	0	5.38	71.8	2.2
U.E. Fk. Walker	40,652	64	3,500	2.27	92.1	23.4
U.E. Fk. Walker	15,867	64	0	5.39	78.4	46.2
U. W. Walker	58,923	64	1,385	4.32	83.0	47.0

POTENTIAL AQUATIC DIVERSITY MANAGEMENT AREAS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Aquatic ecosystems in the Sierra Nevada have been highly altered as the result of dams and diversions, watershed alterations and introductions of non-native species. The native aquatic biota has declined in diversity and abundance as a result. Reversing this trend requires appropriate, systematic management of watersheds throughout the range. Assuming that maintenance of some basic set of the native biota is desirable, a number of options for watershed management are possible, ranging from biodiversity-oriented management of all watersheds to simply reacting to the need to keep species from becoming extinct. A middle series of options, presented here, focuses on designating 42 watersheds as Aquatic Diversity Management Areas (ADMAs), whose first goal of management is the protection of aquatic biodiversity. The watersheds were chosen on the basis of size (greater than 50 km^2 [19 mi^2]), natural hydrologic regime, presence of native fish and amphibians and representativeness (SNEP, Vol. II, Ch. 57, p. 1493).

Suggested ADMAs in Mono County include Buckeye Creek, the West Walker River, Mono Basin, the Owens River above Crowley Reservoir and Convict Creek (SNEP, Vol. II, Ch. 57, Table 57.2). SNEP, Vol. III, Ch. 9 catalogs the potential ADMA watersheds and describes each watershed to indicate why it has been chosen for inclusion in the ADMA watershed system....

The Mono Lake watershed is recommended as an ADMA watershed, despite the fact that the streams are regulated and dominated by exotic trout, because Mono Lake itself is a unique ecosystem. It also has high scientific value in that it has been studied intensively for years and such long-term ecological studies can give us insights into what is happening to the Sierran environment on a much larger scale. Such scientific values are among the principal reasons for also singling out Sagehen Creek and Convict Creek for inclusion as ADMA watersheds, despite their relatively small drainage areas (SNEP, Vol. II, Ch. 57, p. 1495).

The term Significant Natural Area (SNA) is used by the California Department of Fish and Game (CDFG) to indicate areas with unusual biological value, usually as habitat for rare or endangered species or communities. Such areas are typically

small and localized. SNAs designated by the CDFG have no formal protection but can form the basis for preserves. Here the term is used to designate aquatic habitats or ecosystems that contain unusual biotic elements but that are too small to be included as ADMA watersheds. Aquatic SNAs usually need special protection because they contain especially fragile species (e.g., spring-dwelling caddisflies) and/or because they are not contained in an ADMA watershed. Because of their small size and sensitivity to disturbance, aquatic SNAs will typically have to be treated as preserves if they are to continue to maintain their unusual elements; that is, they will have to be actively protected from heavy human use. A system of protected aquatic SNAs would supplement a system of ADMA watersheds, helping to ensure that all native species and natural communities in the Sierra Nevada can persist. Examples of aquatic SNAs include small, isolated streams that contain remnant populations of Lahontan cutthroat trout (e.g., By-Day Creek, Mono County).... (SNEP, Vol, II, Ch. 57, p. 1495-1496).

Examples of potential aquatic Significant Natural Areas in Mono County include:

- Silver King Creek (Upper) in the Carson-Iceberg Wilderness Area, which contains Paiute cutthroat trout;
- White Cliff Lake in the Carson-Iceberg Wilderness Area, which is an isolated cirque lake with native frogs;
- Headwaters of the Little Walker River in the Hoover Wilderness Area, which contains Lahontan cutthroat trout;
- Big Dry Creek Mono in the Humboldt-Toiyabe National Forest, which contains Lahontan cutthroat trout;
- Harvey Monroe Hall Research Natural Area in the Humboldt-Toiyabe National Forest, which contains amphibians and fishless lakes.

(SNEP, Vol. II, Ch. 57, Table 57.3).

TABLE 50
FISH KNOWN OR EXPECTED TO OCCUR IN MONO COUNTY

Scientific Name	Common Name	Special Status[a]
Archoplites interruptus	Sacramento perch	
Catostomus fumeiventris	Owens sucker	
Catostomus platyrhynchus	Mountain sucker	
Catostomus tahoensis	Tahoe sucker	
Cottus beldingi	Piute sculpin	
Cyprinodon nevadensis amargosae	Amargosa pupfish	
Cyprinodon radiosus	Owens pupfish	CA endangered
Cyprinus carpio	Carp	
Gambusia affinis	Mosquitofish	
Gasterosteus aculeatus	Threespine stickleback	
Gila bicolor snyderi	Owens tui chub	CA endangered
Ictaluras melas	Black bullhead	
Ictalurus nebulosus	Brown bullhead	
Ictalurus punctatus	Channel catfish	
Lepomis macrochirus	Bluegill	
Lepomis microlophus	Redear sunfish	
Micropterus dolomieui	Smallmouth bass	
Micropterus salmoides	Largemouth bass	
Oncorhynchus nerka	Sockeye salmon (kokanee)	
Prosopium williamsoni	Mountain whitefish	
Rhinichthys osculus	Owens speckled dace	
Richardsonius egregius	Lahontan redside	
Oncorhynchus aquabonita	Golden trout	
Oncorhynchus clarki henshawi	Lahontan cutthroat trout	
Oncorhynchus clarkii seleniris	Paiute cutthroat trout	
Oncorhynchus inykiss	Rainbow trout	
Salmo trutta	Brown trout	
Salvelinus fontinalis	Eastern brook trout /Brook trout	
Salvelinus namaycush	Lake trout	

NOTES:

a. As noted by the California Natural Diversity Data Base for Mono County, 2000.

SOURCES: Peter Moyle, Inland Fishes of California; James H. Roberts Associates, Preliminary Natural Resource Baseline and Environmental Sensitivity Analysis for Mammoth; Environmental Science Associates, Inc.

SPECIAL HABITATS

The CNDDB identified 10 known locations of important natural communities. The occurrence of these natural communities, listed in Table 51, is due to special circumstances such as pumice flats, natural springs, alkali marshes, geothermal vents or geothermally altered soils (USFS, 1981; Taylor and Buckberg, 1987; CDFG, 1988). Wetlands are also special natural communities because of their importance to wildlife. Potential wetlands throughout Mono County were identified in a Wetlands Study prepared for Mono County by EIP Associates in 1992 and by reference incorporated herein. The special habitats, including potential wetlands, are shown in Figure 28 (see Appendix A).

RIPARIAN AREAS AND WETLANDS

The following discussion is an excerpt from the Status of the Sierra Nevada--Sierra Nevada Ecosystem Project: Final Report to Congress (1996). The text below should be regarded as direct quotations from the source material; page numbers indicated in parentheses refer to the SNEP document and cover the previous paragraph or section.

Riparian habitats are especially important in semiarid regions, where the availability of moisture and a cool, shaded microclimate gives these habitats an ecological importance disproportionate to their areal extent. For example, in the Inyo National Forest, riparian areas constitute less than 0.4% of the land area but are essential for at least one phase of life for about 75% of local wildlife species (Kondolf et al. 1987). In this forest, many recreational activities for its annual 7 million visitors are also concentrated in riparian zones (SNEP, Vol. II, Ch. 36, p. 1009).

Land-management agencies have conducted studies of riparian areas as a component of other assessments or planning studies. Mono County is conducting detailed mapping of wetlands, including riparian areas (R. Curry, University of California, Santa Cruz, 1995). Riparian areas along streams tributary to Mono Lake have been studied by a National Academy of Sciences committee ..., on behalf of parties to litigation over flow requirements for resident trout (Stromberg and Patten, 1990), in support of a water rights adjudication ... and in related studies (Kondolf and Vorster, 1993) (SNEP, Vol. II, Ch. 36, p. 1010).

Where reservoir water is exported from the basin, base flows can be reduced. On Rush Creek, the principal tributary to Mono Lake, no regular base flow releases were made from Grant Lake Reservoir from 1941 to 1981 and a massive die-off of woody riparian vegetation ensued (Stine et al., 1984) (SNEP, Vol. II, Ch. 36, p. 1014-1015).

Excess irrigation water can support riparian vegetation in artificially created wetlands, fed either by surface flows or groundwater recharged by excess irrigation waters. Along Rush Creek in Mono Basin, excess irrigation water infiltrated into permeable bedrock and reemerged downstream as springs. This process maintained high water tables, reestablished perennial flow and thereby supported riparian vegetation even when diversion had completely dried the channel upstream (Kondolf and Vorster 1993) (SNEP, Vol. II, Ch. 36, p. 1015).

SNEP, Volume III, Chapter 1, "Management of Riparian Areas in the Sierra Nevada," does not specifically address Mono County but does present management options for riparian protection.

Riparian areas are the focal point of many resource conflicts in the Sierra Nevada because they are a critical ecological link between land and water. Although scarcity of quantitative information and unaltered reference sites currently limit the development of quantitative conclusions about riparian health across the entire Sierra Nevada, a few generalities emerged from this assessment. Riparian areas have been changed by human activities to varying degrees throughout much of the range. The basic functions of riparian systems, such as providing shade, stability and organic matter to streams and habitat for avian and terrestrial wildlife, still remain in most places although often in impaired form. These functions have been largely lost in thousands of localities. The loss of functions is particularly evident in mountain meadows throughout the Sierra Nevada. A survey of riparian cover from aerial photographs showed that fragmentation is common along most riparian

corridors. Riparian areas lacking vegetative cover identified in the aerial photograph analysis were usually associated with vehicular access. Roads and urban development have converted riparian areas to impermeable surfaces and channelized streams. Stream crossings by roads impact riparian areas at thousands of places and are the main current impact associated with timber harvesting. ... Overgrazing has altered riparian communities throughout much of the Sierra Nevada. Impacts from overgrazing vary from subtle changes in plant vigor to conversion of wet meadows into sparsely vegetated and eroding landscapes. Besides these continuing impacts, future risks to riparian areas include accelerated urban development and additional water development. There are thousands of opportunities for restoration of locally degraded riparian areas. Streamside vegetation has remarkable ability to recover from disturbance, but artificial disturbances need to be removed or relaxed to give the natural recovery processes a chance (SNEP, Vol. III, Ch. 5, p. 203).

Riparian width has decreased dramatically in many eastern Sierra Nevada streams on alluvial fans (Taylor, 1982). Riparian communities along stream reaches that lose water through seepage into their bed or banks are at particular risk from diversions (Jones and Stokes Associates, 1989; Kondolf, 1989). About one-third of all stream reaches in Inyo and Mono counties have been dewatered with severe consequences for riparian environments (Taylor, 1983). Riparian vegetation has essentially disappeared where no water is permitted to flow in the natural channel (e.g., segments of Rush Creek in the Mono basin [Stine, 1991]). In channels depleted of riparian vegetation, floods have caused severe bank erosion, channel migration and road failures (Vorster and Kondolf, 1989). The loss of riparian vegetation contributed substantially to the instability of the channels (Vorster and Kondolf, 1989). ... Augmentation of flows at the receiving end of trans-basin diversion has widened channels and has pushed back riparian vegetation, as in the case of the upper Owens River (Stromberg and Patten, 1991) (SNEP, Vol. III, Ch. 5, p. 217).

Recent legal developments regarding water management in the eastern Sierra Nevada have led to the restoration of several stream segments that have been dewatered for decades. In 1994, the State Water Resources Control Board amended the water rights licenses on streams tributary to Mono Lake to increase flows and require restoration of the channels and associated habitat (Los Angeles Department of Water and Power, 1995). Restoration work completed between 1991 and 1995 focused on physical habitat improvements for fish and reestablishing riparian vegetation (e.g., Trihey and English, 1991; Stine, 1994). The next phase of restoration proposes to return large flows to the channels and allow natural stream dynamics to control the redevelopment of these long-dry channels (Ridenhour et al. 1995). Re-establishment of riparian vegetation would also be part of the continuing program, but considerable controversy surrounds the potential role of channel maintenance and flushing flows (Los Angeles Department of Water and Power 1995) (SNEP, Vol. III, Ch. 5, p. 234).

Wetlands in mountain areas have received much less attention than their counterparts in lowlands and coastal areas. Detailed investigations of wetlands in Mono County began in 1991 with a study of the Bridgeport Valley (Curry, 1992). Mono County and the Lahontan Regional Water Quality Control Board continue to advance wetland mapping and planning with another field effort in 1995 by Curry and his associates. Initial results include discovery of a variety of unusual types of wetlands and their associated floras. One particular wetland in southern Mono County, Fish Slough, has attracted attention for at least 40 years because of its

value as a refuge for rare fish and plants (Pister and Kerbavaz 1984; Odion et al. 1992) (SNEP, Vol. III, Ch. 5, p. 236).

Almost every water project results in a break in the continuity of the riparian vegetation. The overall effects of this fragmentation are unknown. Regulation and diversion of streamflow have markedly altered riparian vegetation over thousands of kilometers. Where streams have been totally or seasonally dewatered, such as lower Rush and Parker creeks in the Mono Basin until a few years ago, riparian vegetation died out. In streams with diminished volumes, the riparian area becomes thinner as groundwater recharge from the stream is not as great as before diversion. In streams below dams that reduce flood peaks, the riparian vegetation usually encroaches upon the channel (SNEP, Vol. III, Ch. 5, p. 239).

There is tremendous potential for rehabilitation of degraded riparian areas. Some riparian vegetation tends to become reestablished rapidly once a chronic disturbance is removed, provided adequate water is available. Often, the chronic disturbance simply is the lack of water below a diversion. Even when streams have been completely dewatered for decades, resumption of streamflow rapidly returns life to the riparian area. Rewatering of long-diverted streams in the Mono Basin and the Owens Gorge below Crowley Lake has had dramatic results in just a few years. Geomorphic and wildlife recovery will require decades, but the reestablishment of a basic vegetation canopy is a fundamental step to ecosystem recovery (SNEP, Vol. III, Ch. 5, p. 241).

WILDLIFE USE AREAS

Throughout Mono County there are also wildlife use areas. These areas are designated for the unique role they play for wildlife species in breeding, raising young, wintering, summering and migrating. In Mono County, there are important deer migratory routes, summer and winter ranges and holding areas that are included in recent studies of the major herds of the county; sage grouse leks and general use areas; pronghorn antelope and bighorn sheep use areas; and more general use areas by water-fowl and raptors. Non-native feral goat and wild horse and burro areas are also shown. Non-native species have the potential to adversely impact native species in the struggle to meet food and habitat requirements. Figures 30 through 33 (in Appendix A) show these wildlife use areas.

In addition, Mono Lake is an important area for migrating birds. In 1991, Mono Lake was designated as an Internation Reserve in the Western Hemisphere Shorebird Reserve Network, primarily for its role in the annual migration of the Wilson's Phalarope.

The Inyo and Toiyabe National Forest Land and Resource Management Plans designate specific Management Areas that emphasize wildlife use and enhancement.

BIOLOGICAL RESEARCH AREAS

Within Mono County, there are areas that lend themselves to various biological studies due to their unique on-site resources. To encourage ongoing research in these locations, agencies have declared these sites research areas. Table 52 lists these areas and describes their specific locations, sizes and major resources.

TABLE 51
MONO COUNTY SPECIAL HABITATS

Map No. [a]	Name of Area	Special Values
44	Lahontan Conifer Forest Stream	The site offers riparian cover of willow and aspen. River bottom cobble and gravel. Habitat for brook trout downstream.
45	Lahontan Cutthroat Trout Stream	Excellent overall habitat for *Oncorhynchus clarkii henshawi* with the exception of spawning gravel. The area is impacted from grazing.
46	Lahontan Fishless Glacial Lake	Small lake in succession to meadow. Lake is eutrophic with water lilies and other emergent vegetation surrounded by meadow and conifer forest.
47	Lahontan Great Basin Scrub Perennial Pool	Area with thermal springs allowing for thermophillic algae to grow and invertebrates to live in patches of cooler outflow.
48	Mono Pumice Flat	Several locations catering to plant assemblages of *chrysothamnus parryivulcanicus--stipa elmeri. Lupinus duranii* and *astragalus monoensis,* both with federal candidate status, are frequently present on site.
49	Owens Mojave Helocrene	The site offers a low gradient stream lined with bulrush, a silt bottom and spring pools. Habitat for the native hydrobiid snail, exotic gambusia and crayfish.
50	Owens Mojave Limnocrene	The site contains springs with a population of *gila bicolor snyderi.* Exotic rainbow and brown trout are also present. Aquatic vegetation is abundant.
51	Owens Mojave Desert Perennial Pool	Site provides habitat for native hydrobiid snail, physa and lymnaea. Some bulrush along stream and pond. Livestock grazing on surrounding land without impact to site.
52	Owens Mojave Perennial Playa Lake	Rare salt lake. *Artemia monica* and *Ephydra hians* are the main species on the site. Island within lake constitutes an important bird nesting area. The lowering of lake levels presents a serious threat to imperil shrimp and nesting bird populations.
53	Transmontane Alkali Marsh	*Districhlis spicata, Scirpus* sp., *Typha* sp., *Distichlis* sp., *Carex* sp. and *Juncus* sp. occur within the site.
54	Wetlands	Wetlands provide important habitat for wildlife; improve water quality by filtering out unwanted nutrients, sediments and toxins; provide shoreline erosion control; and support the beginning of the food chain.

NOTES: a) Refer to Figure 28. SOURCE: California Natural Diversity Data Base.

Insert Bio Area Table 52

TABLE 52 (continued)

Name	Location	Size (Acres)	Agency	Major Features
Whippoorwill Flat Research Natural Area	Basin Ranges, eastern slope of Inyo Mtn., northeast slope of Waucoba Mtn., southeast side of Squaw Peak	3,328	USFS	This area contains a remarkably dense forest of pinon pine along with the plant association typical of the middle and upper elevation regions of the southwestern Great Basin. It also contains plants endemic to or rare in the Inyo Mountains.
Fish Slough Area of Critical Environmental Concern	Tri-Valley area, about four miles north of Bishop	35,926	BLM	Site of an unusual aquifer containing a lush riparian zone. The slough supports several unique species of flora and fauna, including the endangered Owens pupfish, Owens dace and Owens tui chub.
Travertine Hot Springs Area of Critical Environmental Concern	South of Bridgeport	40	BLM	The area has extremely unusual rock formations.
Mono Lake Tufa Reserve	Surrounding Mono Lake	17,000	State Parks	Site provides native grassland, marshes and tufa.
Mono Basin National Forest Scenic Area	Surrounding Mono Lake	118,300	USFS	Site provides native grassland, marshes and tufa. Site for ongoing wildlife research.
Slinkard-Little Antelope Wildlife Area	Monitor Pass, west of Coleville, two connected valleys	1,620	DFG	Site for ongoing wildlife research. The area provides deer winter range. Slinkard and Mill creeks are potential reintroduction sites for Lahontan cutthroat trout.
By-Day Creek Ecological Reserve	Northwest of Bridgeport	160	DFG	Site for enhancement of Lahontan cutthroat trout population.

TABLE 52 (continued)

Name	Location	Size (Acres)	Agency	Major Features
Hot Creek Hatchery	East of Mammoth Lakes, about six miles	137	DFG	Site for raising various trout species. Owens tui chub in some nearby pools.

SOURCES:
US Forest Service, Draft Environmental Impact Statement, Inyo National Forest; US Bureau of Land Management, Areas of Critical Environmental Concern; California Department of Fish and Game, Preston Johns, Lands Program Coordinator; California Department of Parks and Recreation, Art Fong, Associate State Park Resource Ecologist.

SPECIAL-STATUS SPECIES

California is well known for the diversity of its natural resources. The CDFG recognized the need to identify special species and habitats and to develop plans to preserve and maintain them. To help accomplish this goal, they established the California Natural Diversity Data Base (CNDDB), which inventories special-status species that are officially listed (state and federal) endangered, threatened and rare; plants listed by the California Native Plant Society (CNPS) as rare and endangered; and species considered by the scientific and conservation communities to be deserving of such listing (e.g., federal candidates species, agency sensitive species, etc.). The database is designed to function as a single source of information on the locations of special-status plants and animals, thus increasing the potential for species identification early in the planning process to avoid potential problems and establish effective mitigation measures. Database information, however, does not constitute a final assessment of special-status plants and animals in a given area. Accordingly, the U.S. Forest Service, BLM, U.S. Fish and Wildlife Service and the California Native Plant Society have provided information included in Table 53 listing special-status plant and animal species known or expected to occur in Mono County. Special-status species and special habitats registered with the CNDDB – and identified by the BLM and USGS – have been mapped in Figure 32 (see Appendix A).

In addition to the special-status plant, animal and habitat information received from CNDDB, the database identified three additional species for which specific habitat information is unavailable and unmapped: the Northern goshawk (*Accipiter gentilis*), Prairie falcon (*Falco mexicanos*) and spotted owl (*Strix occidentalis lucida*). The goshawk requires large trees with large branches to support the nest and therefore depends upon large, old growth trees. It breeds in montane areas with conifer forest, but can be found in eastside pine, black oak, pinon-juniper and lowland riparian vegetation types. The falcon requires cliffs with ledges for nesting and occurs throughout (and beyond) Mono County, using grasslands and other barrier areas as hunting sites. The spotted owl is known in Mono County from three responses to taped calls over a 10-year survey period. This low frequency of responses suggests that occasionally individuals may pass through the Eastern Sierra, but that they probably do not breed here (Hargis, 1989). Further studies should accompany any proposed development plans in areas that offer potential habitat for these species.

The Federal Endangered Species Act requires federal agencies to conduct formal Section 7 consultation with the U.S. Fish and Wildlife Service if a project under its review has the potential to impact a federally listed specie. For state-listed species, CEQA requires a lead agency to obtain a written jeopardy opinion from CDFG during preparation of the EIR.

TABLE 53
SPECIAL STATUS SPECIES KNOWN TO OCCUR IN MONO COUNTY

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
	PLANTS					
	Abronia alpina			C1		X
	Angelica scabrinda	Charleston Angelica		C1		X
	Antennaria soliceps	Charleston pussytoes		C1		X
	Arabis bodiensis	Rock cress			2	
	Arabis cobrensis	Rock cress			2	
	Arabis ligniferia	Rock cress			3	
	Arabis microphylla var. microphylla	Small-leaved rock cress			4	
	Arabis ophira					X
	Arabis pinzliae	Pinzl's rock cress		C2		X
1	*Arabis tiehmii*	Congdon's rock cress			2	
	Arctostaphylos uva-ursi ssp. monoensis	Mono manzanita		C2	3	
	Arenaria stenomeres			C3c		X
	Asclepias cryptoceras ssp. cryptoceras	Milkweed			3	
	Asclepias eastwoodiana	Eastwood milkweed		C2		X
	Astragalus aequalis	Clokey milk-vetch			2	
	Astragalus geyeri var. geyeri	Milk-vetch			2	
2	*Astragalus Hohannis Howellii*	Long Valley milk-vetch	R	C3c	1B	
	Astragalus kentrophyta var. panaus	Sweetwater mountains Milk-vetch			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
3	*Astragalus lentiginosus var. pisciensis*	Fish Slough milk-vetch			C1	1B
	Astragalus mohavensis var. hemigyrus	Half-ring pop milk-vetch		C2		X
4	*Astagalus monoensis var. monoensis*	Mono milk-vetch	R	C2	1B	X
	Astragalus oophorus var. clokeyanus	Lee Vining Canyon milk-vetch		C1		
	Astragalus oophorus var. lavinii	Milk-vetch			3	
5	*Astragalus pseudiodanthus*	Tonopah milk-vetch		C3c	1B	
	Astragalus ravenii	Milk-vetch		C2		X
	Astragalus remotas	Milk-vetch		C2		X
	Blepharidachne kingii	Hack			2	
6	*Calcochortus excavatus*	Inyo star-tulip		C2		
	Clayatonia megarhiza var. bellidifolia	Spring beauty		C3c	2	
	Caulostramina jaegeri	Jaeger's caulostramina		C2		X
	Centaurium namophilum var. nevadensis	Centaury			4	
	Cryptantha hoffmannii	Hoffman's cryptantha		C2		
	Cryptantha Roosiorum	Bristlecone catseye	R	C2		X
	Cryptantha Tumulosa	Mojave cryptantha		C3c		X
	Crymopterus Goodrichii	Goodrich spring parsley		C2		X
7	*Dedeckera eurekensis*	July gold	R	C2	1B	X
	Draba Arida			C2		X

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
8	*Draba asterophora*	Tahoe draba var. aserpohora		C3c		X
9	*Draba cana*	Hoary draba			2	
	Draba crassifolia var. Nevadensis	Arc dome draba		C3c		X
	Draba cruciata var. integrifolia	Whitney Draba				
	Draba Douglassii var. crockeri	Draba		C3c	4	
	Draba jaegeri	Jaeger draba		C2		X
	Draba lemmonii var. incrassata	Sweetwater Mountains draba		C3c	4	
	Cymopterus Goodrichii	Goodrich spring parsely		C2		X
7	*Dedeckera eurekensis*	July gold	R	C2	1B	X
	Draba arida			C2		X
8	*Draba asterophora*	Tahoe draba var. asterophora		C3c		X
9	*Draba cana*	Hoary draba			2	
	Draba crassifolia var. Mevademsos	Arc dome draba		C3c		X
	Draba cruciata var. integrifolia	Whitney Draba				
	Draba Douglassii var. crockeri	Draba		C3c	4	
	Draba jaegeri	Jaeger draba		C2		X
	Draba lemmonii var. incrassata	Sweet Mountain draba		C3c	4	
	Draba paucifucta	Charleston draba		C2		X
10	*Draba quadricostata*	Bodie Hills draba		C3c	1B	X

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
	Draba stenoloba var. ramosa	Blanched draba		C3c	4	
	Elymus scribneri	Rye grass			2	
11	*Eriogonum apmullaceum*	Mono buckwheat		C2	1B	X
12	*Eriogonum beatleyae*	Beatley's buckwheat		C3c	3	
	Eriogonum kearneyi var. kearney	Wild buckwheat			3	
	Eriogonum nutans var. nutans	Wild buckwheat			2	
	Eriogonum wrightii var.	Olanche peak wild buckwheat				
	Eolanchense			C3c		X
	Epilobium nevadense	Nevada willo-herb		C3c		X
	Ferocaatus acanathodes var. acanthodes	Ferocactus		C2		X
	Festuca arizonica	Fescue			2	
	Fimbristylis spadicea			C3c	2	
	Frasera pahutensis	Pahute frasera		C2		X
	Gentiana prostrata	Pigmy gentian			2	
	Glyceria grandis	Manna grass			2	
13	*Hackelia brevicula*	Poison Canyon stickseed		C2	1B	X
	Hackelia sharsmithii					
	Halimolobos virgata			C3c	2	
	Haplopappus alpinus	Alpine golden-rod		C2		X
	Heuchera duranii	Duran's heuchera		C3c	2	
14	*Horkelia hispidula*	White Mountains horkelia			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
	Hulea vestita ssp. inyoensis	Inyo Hulsea		C3c	2	
	Ivesia aperta					X
	Ivesia cryptocaulis	Charleston ivesia		C2		X
	Ivesia sericoleuca					X
	Ivesia Webberi	Webber iesia				X
	Juncus abjectus	Wire-grass			2	
15	*Kobresia myosuroides*	Kobresia			2	
	Lily calochortus excavatus	Inyo County mariposa		C2	1B	
16	*Lupinus duranii*	Mono Lake lupine		C2		X
	Lupinus padre-crowleyi	Dedecker's lupine	R	C2		X
17	*Lupinus sublanatus*	Mono County lupine			3	X
18	*Mimulus glabratus ssp. utahensis*	Utah monkeyflower			2	
	Oryzopsis micrantha	Ricegrass			2	
19	*Pedicularis crenulata*	Scallop-leaved lousewort			2	X
	Penstemon arenarius	Dune penstemon		C2		X
	Penstemon bicolor ssp. biocolor	Bicolored beard tongue		C2		X
	Penstemon bicolor ssp. roseus	Rose-colored beard tongue		C2		X
	Penstemon papillatus	Inyo penstemon		C3c	4	
	Phacelia inyoensis				4	
	Phacelia nashiana					X
20	*Phacelia monoensis*	Mono County phacelia		C2	1B	X
	Pinus aristata	Bristlecone pine			4	

TABLE 53 (continued)

Map No. [a]	Scientific Name	Common Name	Status [b] CDFG	USFWS	CNPS	Other
	Podistrera nevadensis	Sierra podistera			4	
	Polemonium	Mason's sky pilot		C3c	4	
	Rorippa subumbellata	Tahoe yellow-cress	E	C1		X
	Salix brachycarpa	Willow			2	
	Salix nivalis	Willow			2	
	Scirpus clementis	Yosemite bulrush			4	
	Scirpus Rollandii	Bulrush			2	
	Sclerocactus polyancistrus	Mojave fishhook cactus		C3c		X
	Sedum pinetorum	Pine City stonecrop		C2		
	Senecio Pattersonensis	Mono butterweed			4	
	Silene clokeyi	Clokey silene		C2		X
	Silene invisia			C3c		X
	Spartina gracilis	Alkali cordgrass			4	
	Sphaeromeria compacta	Low sagebrush		C1		
	Sphenopholis obtusata var. obtusata	Wedge Grass			2	
21	*Streptanthus oliganthus*	Masonic Mountain flower jewel		C3c	1B	X
	Synthyris ranuncululina	Charleston kittentails	E	C1		X
	Townsendia Jonesii var. tumulosa	Charleston ground daisy		C2		X
	Trifolium andersonii ssp. beatleyae	Beatley's five-leaf clover		C3c	2	
	Trifolium dedeckerae	Dedecker clover		C3c		X
	Viola purpurea va.charles tunensis	Charleston Mountain Viola		C3c		X
	Yosemite scripus	Bulrush clementis			4	

TABLE 53 (continued)

Common Name	Scientific Name	State Listing	# of Occurrences
Amargosa Pupfish	*Cyprinodon Nevadensis Amargosae*	None	1
Bald Eagle	*Haliaeetus Leucocephalus* (Nesting)	Endangered	1
Bank Swallow	*Riparia Riparia* (Nesting)	Threatened	5
Benton Valley Springsnail	*Pyrgulopsis Aardahli*	None	1
California Bighorn Sheep	*Ovis Canadensis Californiana*	Endangered	1
California Gull	*Larus Californicus* (Nesting Colony)	None	2
Fish Slough Springsnail	*Pyrgulopsis Perturbata*	None	3
Golden Eagle	*Aquila Chrysaetos* (Nesting/Wintering)	None	1
Great Grey Owl	*Strix Nebulosa* (Nesting)	Endangered	2
Lahontan Cutthroat Trout	*Oncorhynchus Clarki Henshawi*	None	6
Long-Eared Owl	*Asio Otus* (Nesting)	None	1
Mono Brine Shrimp	*Artemia Monica*	None	1
Mount Lyell Salamander	*Hydromantes Platycephalus*	None	2
Mountain Yellow-Legged Frog	*Rana Muscosa*	None	5
Nelson's Bighorn Sheep	*Ovis Canadensis Nelsoni*	None	1
Northern Goshawk	*Accipiter Gentilis* (Nesting)	None	31
Osprey	*Pandion Haliaetus* (Nesting)	None	1
Owens Pupfish	*Cyprinodon Radiosus*	Endangered	3
Owens Speckled Dace	*Rhinichthys Osculus SSP 2*	None	10
Owens Sucker	*Catostomus Fumeiventris*	None	9
Owens Tui Chub	*Gila Bicolor Synderi*	Endangered	6
Owens Valley Springsnail	*Pyrgulopsis Owensensis*	None	2
Owens Valley Vole	*Microtus Californicus Vallicola*	None	1
Pacific Fisher	*Martes Pennanti Pacifica*	None	3
Paiute Cutthroat Trout	*Oncorhynchus Clarki Seleniris*	None	2
Prairie Falcon	*Falco Mexicanus* (Nesting)	None	16
Sierra Nevada Mt. Beaver	*Aplodontia Rufa Californica*	None	2
Sierra Nevada Red Fox	*Vulpes Vulpes Necator*	Threatened	5
Swainson's Hawk	*Buteo Swainsoni* (Nesting)	Threatened	3
Travertine Band-Thigh Diving Beetle	*Hygrotus Fontinalis*	None	4
Virginia's Warbler	*Vermivora Virginiae* (Nesting)	None	1
Willow Flycatcher	*Empidonax Traillii* (Nesting)	Endangered	4
Wong's Springsnail	*Pyrgulopsis Wongi*	None	5
Yellow Warbler	*Dendroica Petechia Brewsteri* (Nesting)	None	2
Yosemite Toad	*Bufo Canorus*	None	5